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MDCCLXXVIII

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VARIOUS DETACHMENTS OF KNOWLEDGE

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A S T R O N O M Y

IS the knowledge of the nature and properties of the heavenly bodies; their magnitudes, distances, and motions, both real and apparent; together with the natural causes by which their revolutions are performed.

History of Astronomy.

It is probable that astronomy has existed almost from the beginning of the world. As there is nothing more surprising than the regularity of those great luminous bodies, that seem to turn incessantly round the earth, it is easy to judge, that one of the first curiosities of mankind was to consider their courses, and observe their periods. But it was not curiosity only that induced men to apply themselves to astronomical speculations: necessity itself may be said to have obliged them to it; for if the seasons are not observed, which are distinguished by the motion of the sun, it is impossible to succeed in agriculture. If the times proper for making voyages were not previously known, commerce could not be carried on. If the duration of the month and year were not determined, a certain order could not be established in civil affairs, nor the days allotted to the exercise of religion be fixed. Thus, as neither agriculture, commerce, polity, nor religion, could dispense with the want of astronomy, it is evident that mankind were obliged to apply themselves to that science from the beginning of the world.

What Ptolemy relates of the observations of the heavens, by which Hipparchus reformed astronomy almost 2000 years ago, proves sufficiently, that, in the most ancient times, this science was much studied.

It is agreed that astronomy was cultivated in a particular manner by the Chaldeans. The height of the tower of Babel, which the vanity of men erected about 150 years after the flood, the level and extensive plains of that country, the nights in which they breathed the fresh air after the troublesome heats of the day, an unbroken horizon, a pure and serene sky, all conspired to engage that people to contemplate the vast extent of the heavens, and the motions of the stars. From Chaldea astronomy passed into Egypt, and soon after was carried into Phœnicia, where they began to apply its speculative observations to the uses of navigation, by which the Phœnicians soon became masters of the sea and of commerce.

What made them bold in undertaking long voyages, was their custom of steering their ships by the observation of one of the stars of the little bear, which, be-

ing near the immoveable point of the heavens called the *pole*, is the most proper to serve as a guide in navigation. Other nations, less skilful in astronomy, observed only the great bear in their voyages: but as that constellation is too far from the pole to be capable of serving as a certain guide in long voyages, they did not dare to stand out so far to sea as to lose sight of the coasts; and if a storm happened to drive them into the ocean, or upon some unknown shore, it was impossible for them to know by the heavens into what part of the world the tempest had carried them.

Thales, having at length brought the science of the stars from Phœnicia into Greece, taught the Greeks to know the constellation of the little bear, and to make use of it as their guide in navigation. He also taught them the theory of the motion of the sun and moon, by which he accounted for the length and shortness of the days, determined the number of the days of the solar year, and not only explained the cause of eclipses, but shewed the art of predicting them, which he even reduced to practice, foretelling an eclipse which happened soon after. The merit of a knowledge so uncommon in those days, made him pass for the oracle of his times, and occasioned his being reckoned the first of the seven sages of Greece.

Anaximander was his disciple, to whom Pliny and Diogenes Laërtius ascribed the invention of the terrestrial globe; or, according to Strabo, geographical maps. Anaximander is said also to have erected a gnomon at Sparta, by the means of which he observed the equinoxes and solstices, and to have determined the obliquity of the ecliptic more exactly than had ever been done before; which was necessary for dividing the terrestrial globe into five zones, and for distinguishing the climates, that were afterwards used by geographers for shewing the situation of all the places of the earth. The Greeks, assisted by the instructions they had received from Thales and Anaximander, ventured to make considerable voyages, and planted several colonies in remote countries.

Commerce having induced the learned men of Greece to visit other nations, they greatly increased their astronomical knowledge from conversing with the Egyptian priests, who had long made the science of the stars their profession. They also learned many things from the Pythagorean philosophers in Italy, who by some are said to have made so considerable a progress in this science, that they had rejected the common opinions, and

and asserted that the earth and planets moved round the sun, which was at rest in the centre of the system. But others affirm that Pythagoras only mentioned this as a conjecture, which he did not pretend to establish as a system.

Meton greatly distinguished himself at Athens by his profound knowledge in astronomy. He lived in the time of the Peloponnesian war; and was the inventor of the golden number, still placed in the calendar.

The Greeks also improved their knowledge from conversing with the druids, who, according to Julius Cæsar, instructed their pupils in the knowledge of the stars, and of the magnitudes of the heavenly bodies.

This species of learning was more ancient in Gaul than is generally imagined. Strabo has preserved a famous observation, made by Pytheas at Marseilles about 2000 years ago, with regard to the proportion of the sun's shadow to the height of a gnomon at the time of the solstice. Were the circumstances of this observation exactly known, it would be sufficient to resolve the important question, Whether the obliquity of the ecliptic be or be not subject to variation?

Pytheas was not contented with making observations in his own country. His passion for astronomy and geography induced him to travel through Europe, from the pillars of Hercules to the mouths of the Tanais. He also advanced along the shore of the western ocean, towards the north pole, and observed that the days grew longer about the summer solstice, in proportion as he travelled; so that, in the island of Thule, the sun rose almost as soon as it set, the tropic continuing entirely above the horizon. By this means he proved the fallacy of what some philosophers had advanced, namely, that those climates were not habitable; and at the same time shewed the method of distinguishing the climates by the length of the days and nights.

About the time of Pytheas, several of the Greeks applied themselves to astronomy in emulation of each other. Eudoxus, the disciple of Plato, not being satisfied with what was taught on that subject in the schools of Athens, repaired to Egypt, to cultivate astronomy at its source; and having a letter of recommendation from Agesilaus king of Sparta, to Nectanebus king of Egypt, he remained 16 months with the astronomers of that country. At his return, he composed several books upon astronomy; and, among others, a description of the constellations, which Aratus, some time after, turned into verse, by order of Antigonus.

Aristotle, the disciple of Plato, and the contemporary of Eudoxus, made use of astronomy for improving physics and geography. He attempted to determine, by means of astronomical observations, both the figure and magnitude of the earth. He demonstrated, that it was of a spherical form, by the circular appearance of its shadow on the disk of the moon in eclipses; and from the inequality of the meridian altitudes of the sun, which are different in different latitudes.

Callisthenes, who attended Alexander the Great, having been sent to Babylon, found there astronomical observations made by the Babylonians during the space of 1903 years, and sent them to Aristotle.

The princes who succeeded Alexander in the kingdom of Egypt were very careful to draw the most famous astronomers to their courts by their liberality; so that Alexandria soon became the seat of astronomy.

The famous Conon made a vast number of observations; but they have not reached our hands. Aristyllus and Timochares observed the places of the fixed stars, in order to improve navigation and geography. Eratosthenes measured a degree of the meridian, in order to determine the magnitude of the earth. Hipparchus, who also resided at Alexandria, laid the foundation for a methodical system of astronomy; for a new star happening to appear, he made a catalogue of the fixed stars, consisting of 1022. He also described their motion round the poles of the ecliptic, and at the same time applied himself to establish a theory of the solar and lunar motion.

The Romans, who aspired to the empire of the world, encouraged astronomy, and endeavoured to carry it nearer to perfection; and in the reign of Antoninus it began to assume a new face: for Ptolemy, who may be called the restorer of this science, improving from the lights of his predecessors, and adding the observations of Hipparchus, Timochares, and those of the Babylonians, to his own, composed a system of astronomy, entitled, "The Great Syntaxis." It contained the theory and tables of the motion of the sun, moon, and other planets, and of the fixed stars.

But as the beginning of great works are never perfect, it is no wonder that Ptolemy's work was not free from errors and defects. Many ages, however, elapsed without any one's presuming either to correct or complete it. At last, the Arabian princes, having conquered the countries where astronomy had long flourished, procured the work of Ptolemy to be translated into their own language, and called it the *Almagest*. Nor did they stop here; they caused many observations to be made, by which it appeared, that the greatest declination of the sun was one-third of a degree less than what Ptolemy had made it; and that the motion of the fixed stars was not so slow as he believed it. They also ordered a large extent of country under the same meridian to be measured, in order to determine the length of a degree.

This example of the khalifs excited the princes of Europe to promote the improvement of astronomy. The emperor Frederic the second, willing that the Christians should understand astronomy as well as the Barbarians, caused the *Almagest* of Ptolemy to be translated from the Arabic into Latin; and Alfonso king of Castile assembled the most able astronomers from all parts. By his orders they applied themselves to reform astronomy, and compose new tables, which from him were called the *Alphonsoine Tables*.

This work awakened the curiosity of the learned of Europe: they applied themselves to invent instruments for facilitating the observations of the heavenly bodies; they calculated ephemerides, and composed tables for finding the declinations of the planets; and laboured successfully to facilitate the calculation of eclipses. The noble Dane Tycho Brahe was a far more accurate observer than any that preceded him. He published from his own observations, a catalogue of 770 fixed stars; and Nicholas Copernicus revived the ancient Pythagorean system.

John Kepler, a most excellent astronomer, discovered, by the help of Tycho's labours, the true system of the world, and the laws that regulate the motion of the celestial bodies. Galileo, the Florentine philosopher,

pher, is commonly said to have first directed a telescope to the heavens, and by the assistance of that instrument discovered a great many new and surprising phenomena, as the satellites of Jupiter, and their motion, the various phases of Saturn, the increase and decrease of the light of Venus, the mountains and uneven surface of the moon, the spots of the sun, and the revolution of that luminary about its own axis. This honour, however, Dr Pricestley is of opinion, belongs to Zacharias Janfen, who was undoubtedly the first inventor of telescopes. He says, that, having directed his telescope toward the celestial bodies, he plainly discovered the spots of the moon, and several new stars; and that the full moon evidently appeared through this instrument not to be flat, but spherical, the middle part being prominent. Jupiter appeared round, and rather spherical. Sometimes, he said, he saw one, sometimes two, three, and at the most four small stars a little above or below him; and which, as far as he could observe, performed their revolutions round him; but that, he said, he left to the consideration of astronomers.

Hevelius has given us a catalogue of the fixed stars, much larger than that of Tycho, composed from his own curious observations. Huygens and Cassini first saw the satellites of Saturn, and discovered his ring. The indefatigable Mr Flamsteed watched the motion of the stars for more than 40 years; and has obliged the world with such accurate observations on the motions, &c. of the different luminaries, as will transmit his name to the latest posterity: he also published what is called the *Britannic catalogue of fixed stars*, containing above 3000 stars, from his own observations.

The merit of Sir Isaac Newton is too well known to need any encomium, and his discoveries too numerous to be particularly mentioned in this place. It is sufficient to say, that the science is perhaps more indebted to him than to all the other astronomers that ever existed.

The great Dr Halley has obliged the world with the astronomy of comets, a catalogue of the southern stars, astronomical tables, &c.

Other astronomical writers are, Albategnius, Sacro Bosco, Regio Montanus, Purbachius, Lansbergius, Longomontanus, Clavius, Boyer, Dr Hook, Ricciolus, Horrox, Sir Jonas Moore, Taquet, Bullialdus, Seth Ward, count Pagan, Wing, Street, De la Hire, Dr Gregory, Mercator, Whiston, Dr Keil, the two Cassini's, Leadbetter, Hodgson, Brent, Dr Long, the Abbe le Caille, Wright, Ferguson, De la Lande, &c.

SECT. I. *Of the apparent Motions, Magnitudes, and Changes, in the celestial Bodies, as seen by the naked eye.*

As the true motions of bodies at a great distance are to be gathered only from a careful observation of their apparent ones, it is absolutely necessary for those who want to become acquainted with the true motions of the heavenly bodies, to know perfectly the different changes which take place in the heavens as seen from this earth, the only place from which any observation can be made. By carefully attending to these, a little knowledge of optics will enable us to understand with great certainty not only the true system of nature, but also what appearance the heavens would make to a spectator placed in any part of the visible creation.

VOL. I.

The first and most obvious phenomenon is the daily rising of the sun in the east, and his setting in the west; after which the moon and stars appear, still keeping the same westerly course, till we lose sight of them altogether. This cannot be long taken notice of, before we must likewise perceive that neither the sun nor moon always rise exactly in the same point of the heavens. If we begin to observe the sun, for instance, in the beginning of March, we will find that he seems to rise almost every day sensibly more to the northward than he did the day before, to continue longer above the horizon, and to be more vertical at mid-day. This continues till towards the end of June, when he is observed to move backward in the same manner; and this retrograde motion continues to the end of December, or near it, when he begins again to move forwards, and so on.

The motion of the moon through the heavens, as well as her appearance at different times, are still more remarkable than those of the sun. When she first becomes visible at the time she is called the *new-moon*, she appears in the western part of the heavens, and seems to be at no great distance from the sun himself. Every night she not only increases in size, but removes to a greater distance from the sun, till at last she appears in the eastern part of the horizon, just at the time the sun disappears in the western. After this she gradually moves farther and farther eastward, and therefore rises every night later and later, till at last she seems to approach the sun as nearly in the east as she did in the west, and rises only a little before him in the morning, as in the first part of her course she set in the west not long after him. All these different appearances are completed in the space of a month, after which they begin in the same order as before. They are not, however, at all times regular; for at some seasons of the year, particularly in harvest, the moon appears for several days to be stationary in the heavens, and to recede no farther from the sun, in consequence of which she rises for that time nearly at the same hour every night.

In contemplating the stars, it is observed that some of them have the singular property of neither rising in the east, nor setting in the west; but seem to turn round one immoveable point, near which is placed a single star called the *pole* or *pole-star*. This point is more or less elevated according to the different parts of the earth from which we take our view. The inhabitants of Lapland, for instance, see it much more elevated above the horizon, or more vertical, than we do; we see it more vertical than it appears to the inhabitants of France and Spain; and they, again, see it more elevated than the inhabitants of Barbary. By continually travelling south, this star would at length seem depressed in the horizon, and another point would appear in the south part of the horizon, round which the stars in that quarter would seem to turn. In this part of the heavens, however, there is no star so near the pole as there is in the northern part, neither is the number of stars in the southern part of the heavens so great as in the northern. Supposing us still to travel southward, the north-pole would then entirely disappear, and the whole hemisphere would appear to turn round a single point in the south, as the northern hemisphere appears to us to turn round the pole-star.—The general appearance

Apparent motion of the sun.

Of the moon.

Of the stars.

ance of the heavens, therefore, is that of a vast concave sphere, turning round two points fixed in the north and south parts of it, once in 24 hours.

4
Fixed stars,
and planets.

When we further consider the stars, we will find the greatest part of them to keep their places with respect to one another; that is, if we observe two stars having a certain apparent distance from each other this night, we will observe them to have the same tomorrow, and every other succeeding night; but we will by no means observe them to have the same places either with respect to the sun or moon, as must be readily understood from what we have already said. Neither do all the stars in the heavens appear to be of this fixed kind. Some of them, on the contrary, change their places very remarkably with regard to the fixed stars, and with regard to one another. Of these there are only five, distinguished by the name of *planets*, (from *πλανω*, to err or wander), and called by the names of *Mercury*, *Venus*, *Mars*, *Jupiter*, and *Saturn*.

Mercury is a small star, but emits a very bright white light: though, by reason of his always keeping near the sun, he is seldom to be seen; and when he does make his appearance, his motion towards the sun is so swift, that he can only be discerned for a short time. He appears a little after sunset, and again a little before sunrise.

Venus, the most beautiful star in the heavens, known by the names of the *morning* and *evening star*, likewise keeps near the sun, though he recedes from him almost double the distance of *Mercury*. In consequence of this property she is never seen in the eastern quarter of the heavens when the sun is in the western; but always seems to attend him in the evening, or to give notice of his approach in the morning.

Mars is of a red fiery colour, and always gives a much duller light than *Venus*, though sometimes he equals her in size. He is not subject to the same limitation in his motions as *Mercury* or *Venus*; but appears sometimes very near the sun, and sometimes at a great distance from him; sometimes rising when the sun sets, or setting when he rises. Of this planet it is remarkable, that when he approaches any of the fixed stars, which all the planets frequently do, these stars change their colour, grow dim, and often become totally invisible, though at some little distance from the body of the planet.

Jupiter and *Saturn* likewise often appear at great distances from the sun. The former shines with a bright light somewhat reddish, and the latter with a pale faint one; and the motion of *Saturn* among the fixed stars is so slow, that, unless carefully observed, he will not be thought to move at all.

Besides the motions which we observe in all these planets, their apparent magnitudes are very different at different times. Every person must have observed that *Venus*, though she constantly appears with great splendour, is not always equally big. But this apparent difference of magnitude is most remarkable in the planet *Mars*, which sometimes appears no less than 25 times larger than at others. This increase of magnitude is likewise very remarkable in *Jupiter*, but less so in *Saturn* and *Mercury*.

Though we have thus described the motions of the planets, with respect to their apparent distances from

the sun, they by no means appear to us to move regularly in the heavens, but, on the contrary, in the most complex and confused manner that can be imagined, sometimes going forward, sometimes backward, and sometimes seeming to be stationary. Plate XLIV. fig. 2. represents the apparent paths of *Mercury* and *Venus*, as traced by *Callini* and *Mr Ferguson*. They all seem to describe looped curves; but it is not known when any of these curves would return into themselves, except that of *Venus*, which returns into itself every eighth year. In the figure referred to, that which has the fewest loops is the apparent path of *Venus*, the other that of *Mercury*. On each side of the loops they appear stationary; in that part of each loop near the earth, retrograde; and in every other part of their path, direct.

These, however, are not the only moving bodies which are to be observed in the celestial regions. The five above mentioned are indeed the only ones which appear almost constantly, or disappear only at certain intervals, and then as certainly return. But there are others which appear at uncertain intervals, and with a very different aspect from the planets. These are called *Comets*, from their having a long tail, somewhat resembling the appearance of hair. This, however, is not always the case; for some comets have appeared which were as well defined and as round as planets: but in general they have a luminous matter diffused around them, or projecting out from them, which to appearance very much resembles the *Aurora Borealis*. When these appear, they come in a direct line towards the sun, as if they were going to fall into his body; and after having disappeared for some time in consequence of their proximity to that luminary, they fly off again on the other side as fast as they came, projecting a tail much greater and brighter in their recede from him than when they advanced towards him; but, getting daily at a farther distance from us in the heavens, they continually lose of their splendour, and at last totally disappear. Their apparent magnitude is very different: sometimes they appear only of the bigness of the fixed stars; at other times they will equal the diameter of *Venus*, and sometimes even of the sun or moon themselves. So, in 1652, *Hevelius* observed a comet which seemed not inferior to the moon in size, though it had not so bright a splendour, but appeared with a pale and dim light, and had a dismal aspect. These bodies will also sometimes lose their splendour suddenly, while their apparent bulk remains unaltered. With respect to their apparent motions, they have all the inequalities of the planets; sometimes seeming to go forwards, sometimes backwards, and sometimes to be stationary.

Though the fixed stars are the only marks by which astronomers are enabled to judge of the courses of the moveable ones, and though they have never been observed to change their places, yet they seem not to be endued with the permanency even of the earth and planets, but to be perishable or destructible by accident, and likewise generable by some natural cause. Several stars observed by the ancients are now no more to be seen, but are destroyed; and new ones have appeared, which were unknown to the ancients. Some of them have also disappeared for some time, and again become visible. Of these, a very remarkable one is mentioned by *Dr Keil*, in that part of the heavens called

7
Comets.

5
Apparent
magnitudes
of the plan-
ets differ-
ent times.

6
Their irreg-
ular mo-
tions.

8
Fixed stars
seemingly
destructible
and genera-
ble.

called the *neck of the whale*; which for eight or nine months of the year withdrew itself from the sight, and for the other three or four months was constantly changing its lustre and bigness. Its appearance was attended with the greatest irregularities; sometimes it appeared much smaller than at others; sometimes it disappeared in three months, and sometimes appeared for four months; nor did the increase or decrease of its magnitude answer to the difference of the times of its appearance.

We are also assured from the observations of astronomers, that some stars have been observed which never were seen before, and for a certain time they have distinguished themselves by their superlative lustre; but afterwards decreasing, they vanished by degrees, and were no more to be seen. One of these stars being first seen and observed by Hipparchus, the chief of the ancient astronomers, set him upon composing a catalogue of the fixed stars, that by it posterity might learn whether any of the stars perish, and others are produced afresh.

After several ages, another new star appeared to Tycho Brahe and the astronomers that were cotemporary with him; which put him on the same design with Hipparchus, namely, the making a catalogue of the fixed stars. Of this, and of the other stars which have appeared since that time, we have the following history by Dr Halley: "The first new star in the chair of Casiopeia, was not seen by Cornelius Gemma on the eighth of November 1572, who says, he that night considered that part of the heaven in a very serene sky, and saw it not: but that the next night, November 9, it appeared with a splendour surpassing all the fixed stars, and scarce less bright than Venus. This was not seen by Tycho Brahe before the 11th of the same month: but from thence he assures us that it gradually decreased and died away, so as in March 1574, after sixteen months, to be no longer visible; and at this day no signs of it remain. The place thereof in the sphere of fixed stars, by the accurate observations of the same Tycho, was $0^{\circ} 9' 17''$ a 1^{ma} * φ^{16} , with $53^{\circ} 45'$ north latitude.

"Such another star was seen and observed by the scholars of Kepler, to begin to appear on Sept. 30. *fl. vet.* anno 1604, which was not to be seen the day before: but it broke out at once with a lustre surpassing that of Jupiter; and like the former, it died away gradually, and in much about the same time disappeared totally, there remaining no footsteps thereof in January 1605. This was near the ecliptic, following the right leg of Serpentarius; and by the observations of Kepler and others, was in $7^{\circ} 20' 00''$ a 1^{ma} * φ , with north latitude $1^{\circ} 56'$. These two seem to be of a distinct species from the rest, and nothing like them has appeared since.

"But between them, *viz.* in the year 1596, we have the first account of the wonderful star in Collo Ceti, seen by David Fabricius on the third of August, *fl. vet.* as bright as a star of the third magnitude, which has been since found to appear and disappear periodically, its period being precisely enough seven revolutions in six years, tho' it returns not always with the same lustre. Nor is it ever totally extinguished, but may at all times be seen with a six-foot tube. This was singular in its kind, till that in Collo Cygni was discovered. It pre-

cedes the first star of Aries $1^{\circ} 40'$, with $15^{\circ} 57'$ south latitude.

"Another new star was first discovered by William Janfonius in the year 1600, in *pectore*, or rather in *eductione*, Colli Cygni, which exceeded not the third magnitude. This having continued some years, became at length so small, as to be thought by some to have disappeared entirely: but in the years 1657, 58, and 59, it again arose to the third magnitude; though soon after it decayed by degrees to the fifth or sixth magnitude, and at this day is to be seen as such in $5^{\circ} 18' 38''$ a 1^{ma} * φ , with $55^{\circ} 29'$ north latitude.

"A fifth new star was first seen by Hevelius in the year 1670, on July 15. *fl. vet.* as a star of the third magnitude, but by the beginning of October was scarce to be perceived by the naked eye. In April following it was again as bright as before, or rather greater than of the third magnitude, yet wholly disappeared about the middle of August. The next year, in March 1672, it was seen again, but not exceeding the sixth magnitude: since when, it has been no further visible, though we have frequently sought for its return; its place is $9^{\circ} 3' 17''$ a 1^{ma} * φ , and has lat. north $47^{\circ} 28'$.

"The sixth and last is that discovered by Mr G. Kirch in the year 1686, and its period determined to be of $404\frac{1}{2}$ days; and though it rarely exceeds the fifth magnitude, yet it is very regular in its returns, as we found in the year 1714. Since then we have watched, as the absence of the moon and clearness of the weather would permit, to catch the first beginning of its appearance in a six-foot tube, that, bearing a very great aperture, discovers most minute stars. And on June 15, last, it was first perceived like one of the very least telescopic stars: but in the rest of that month and July, it gradually increased, so as to become in August visible to the naked eye; and so continued all the month of September. After that, it again died away by degrees; and on the eighth of December, at night, was scarce discernible by the tube; and, as near as could be guessed, equal to what it was at its first appearance on June 25: so that this year it has been seen in all near six months, which is but little less than half its period: and the middle, and consequently the greatest brightness, falls about the 10th of September."

Concerning the changes which happen among the fixed stars, Mr Montanere, professor of mathematics at Bononia, gave the following account, in a letter to the Royal Society, dated April 30th, 1670. "There are now wanting in the heavens two stars of the second magnitude in the stern of the ship Argo, and its yard; Bayerus marked them with the letters β and γ . I, and others, observed them in the year 1664, upon the occasion of the comet that appeared that year: when they disappeared first, I know not: only I am sure that in the year 1668, upon the 10th of April, there was not the least glimpse of them to be seen; and yet the rest about them, even of the third and fourth magnitudes, remained the same. I have observed many more changes among the fixed stars, even to the number of an hundred, though none of them are so great as those I have shewed."

A very remarkable appearance in the heavens is *Galaxy*, or that called the *galaxy or milky-way*. This is a broad milky-way circle, sometimes double, but for the most part single; surrounding the whole celestial concave. It is of a

whitish colour, somewhat resembling a faint Aurora Borealis; but Mr Brydone, in his journey to the top of mount *Ætna*, found that phenomenon to make a glorious appearance, being, as he expresses it, like a pure flame that shot across the heavens*.

* See the article *Ætna*.
13
Eclipses.

The only appearances, besides those already mentioned, which are very observable by the unassisted eye, are those unexpected obscurations of the sun and moon, commonly called *eclipses*. These are too well known, and attract the attention too much, to need any particular description. We have, however, accounts very well authenticated, of obscurations of the sun continuing for a much longer time than a common eclipse possibly can do, and likewise of the darkness being much greater than it usually is on such occasions; and that these accounts are probably true, we shall afterwards have occasion to observe.

Sect. II. Of the Appearances of the Celestial Bodies through Telescopes.

13
Why the celestial bodies appear dim through telescopes.

By means of this instrument we are enabled in some measure to ascend into the celestial regions, and view the sun, moon, and stars, as they would appear to us if we were brought as many times nearer to them as the telescope magnifies, provided the light proceeding from the luminary we view was diminished in the same proportion. Thus, supposing we view the moon through a telescope magnifying 1000 times, her face will appear 1000 times bigger to us than it does to our naked eye, and we will perceive vast numbers of spots in it which are imperceptible to our naked eye: but then she will also appear 1000 times more dim through the telescope than she does to the naked eye; so that those who look at her through a telescope for the first time, will be greatly disappointed, if they are not warned of this diminution of light. The reason of this is, that the telescope cannot increase the quantity of light which falls upon itself from the moon, and by which only she is or can be visible to us. This quantity of light, however, is by the magnifying powers of the telescope spread over a proportionably large surface; and therefore the moon or other body appears magnified indeed, but with a splendor vastly inferior to that with which she appears to the naked eye.

Hence we may see, that the advantages arising from telescope, with regard to the giving us a near view of the celestial bodies, are not near so great as one would at first imagine: for though we should suppose a telescope capable of magnifying 240,000 times, by which we could see the moon at the distance of only a single mile, we could only have this view with a light 240,000 times less than the moon at present affords us; and how imperfectly objects at the distance of a mile could be seen by such a light, any one may easily imagine. We are not, however, to imagine, that the light here spoken of would be 240,000 times less than moon-light; it would only be 240,000 times less than that wherewith she appears illuminated at present. The moon, we know, is enlightened by the sun, as well as the earth is; and could the telescope increase the quantity of light as much as it does the apparent surface, we would, with a telescope magnifying 240,000 times, see all objects in the moon as well as we do terrestrial objects at a mile's distance when the sun shines bright-

est: but by reason of this incapacity of the telescope to increase the quantity of light, we could only see the lunar objects as well as we would do terrestrial ones a mile distant, with a light 240,000 times less than the light of the sun, or with a light little better than moon-light; for the light of the sun is computed to be 300,000 times stronger than that of the moon.

What we have here said of the moon is applicable to all the other celestial bodies, but not in the same degree. If we look at the sun, for instance, whose lustre is too great for our naked eye to bear, supposing the telescope to magnify as many millions of times as there are miles between us and the sun, we would perceive objects in him as distinctly as could be done at the distance of a mile, not with the light of sunshine upon this earth, but with that intense light which is emitted from the sun at a mile's distance from his body. This is on the supposition that the telescope could increase the quantity of the light as well as magnify the apparent surface; but, being destitute of this power, the light with which the sun would be seen through such a telescope is as many millions of times less than the abovementioned intense light, as the number of times the telescope magnifies, and which, according to the latest calculations, behaved to be upwards of 95 millions. It must be observed, however, that no telescopes ever have been, or probably ever will be, invented, whose magnifying powers are so great as either of those we have mentioned. The greatest magnifying power we have yet heard of in any telescope is in one made by the late Mr James Short, which magnifies 1,200 times; and, by having another applied to it, is said to magnify 60,000 times.

From these considerations it will be apparent, that our telescopic views of the celestial objects can be but imperfect, and that conjectures drawn from them must be very vague and uncertain. It is also plain, that, *ceteris paribus*, our views of Venus and Mercury, the planets nearest the sun, ought to be more distinct than of the more remote ones, Mars, Jupiter, and Saturn; because Venus and Mercury are much more strongly illuminated than the others: but this is not found to hold in fact; which is very surprising, as a strong light ought to be much farther and more strongly reflected from any object than a weak one. The general appearances of each of the celestial bodies, when viewed with the best telescopes, the large one by Mr Short abovementioned excepted, are as follow.

1. The sun, when viewed with but an ordinary instrument, and sometimes through a piece of smoked glass without any telescope, discovers on his surface numbers of black, or rather less bright, spots, of various shapes and sizes. Sometimes these spots will vanish in a very short time from their first appearance; sometimes they travel over his whole disk, or visible surface, from west to east, when they disappear; and in 12 or 13 days they appear again, so as to be known, by their size and shape, to be the same that formerly disappeared. Those, however, which are of the longest continuance, never appear to have any durability or solidity of consistence, but soon vanish and become bright like the rest of the surface.

The most remarkable phenomena of these spots have been remarked by Scheiner and Hevelius, and are as follow. 1. Every spot, which hath a nucleus, or considerably

13
Spots on the sun discovered by telescopes.

15
Account of their phenomena by Scheiner & Hevelius.

siderably dark part, hath also an umbra, or fainter shade, surrounding it. 2. The boundary betwixt the nucleus and umbra is always distinct and well defined. 3. The increase of a spot is gradual, the breadth of the nucleus and umbra dilating at the same time. 4. In like manner, the decrease of a spot is gradual, the breadth of the nucleus and umbra contracting at the same time. 5. The exterior boundary of the umbra never consists of sharp angles; but is always curvilinear, how irregular soever the outline of the nucleus may be. 6. The nucleus of a spot, whilst on the decrease, often changes its figure by the umbra encroaching irregularly upon it, inasmuch that in a small space of time new encroachments are discernible, whereby the boundary betwixt the nucleus and umbra is perpetually varying. 7. It often happens, by these encroachments, that the nucleus of a spot is divided into two or more nuclei. 8. The nuclei of spots vanish sooner than the umbra. 9. Small umbrae are often seen without nuclei. 10. An umbra of any considerable size is seldom seen without a nucleus in the middle of it. 11. When a spot which consisted of a nucleus and umbra is about to disappear, if it is not succeeded by a *facula*, or spot brighter than the rest of the disk, the place where it was is soon after not distinguishable from the rest.

¹⁶
By Dr Wilson of Glasgow.
In the Philosophical Transactions, Vol. LXIV. Dr Wilson, professor of astronomy at Glasgow, hath given a dissertation on the nature of the solar spots, and mentions the following appearances. 1. When the spot is about to disappear on the western edge of the sun's limb, the eastern part of the umbra first contracts, then vanishes, the nucleus and western part of the umbra remaining; then the nucleus gradually contracts and vanishes, while the western part of the umbra remains. At last this disappears also; and if the spot remains long enough to become again visible, the eastern part of the umbra first becomes visible, then the nucleus; and when the spot approaches the middle of the disk, the nucleus appears environed by the umbra on all sides, as already mentioned. 2. When two spots lie very near to one another, the umbra is deficient on that side which lies next the other spot: and this will be the case, though a large spot should be contiguous to one much smaller; the umbra of the large spot will be totally wanting on that side next the small one. If there are little spots on each side of the large one, the umbra does not totally vanish; but appears flattened, or pressed in towards the nucleus on each side. When the little spots disappear, the umbra of the large one extends itself as usual. This circumstance, he observes, may sometimes prevent the disappearance of the umbra in the manner abovementioned; so that the western umbra may disappear before the nucleus, if a small spot happens to break out on that side.

¹⁷
By Mr Wollaston.
In the same volume, p. 337. Mr Wollaston observes, that the appearances mentioned by Dr Wilson are not constant. He positively affirms, that the *faculae* or bright spots on the sun are often converted into dark ones. "I have many times (says he) observed, near the eastern limb, a bright *facula* just come on, which has the next day shewn itself as a spot, though I do not recollect to have seen such a *facula* near the western one after a spot's disappearance. Yet I believe, both these circumstances have been observed by others; and perhaps not only near the limbs. The circumstance

of the *faculae* being converted into spots I think I may be sure of. That there is generally (perhaps always) a mottled appearance over the face of the sun, when carefully attended to, I think I may be as certain. It is most visible towards the limbs, but I have undoubtedly seen it in the centre; yet I do not recollect to have observed this appearance, or indeed any spots, towards his poles. Once I saw, with a 12 inch reflector, a spot burst to pieces while I was looking at it. I could not expect such an event, and therefore cannot be certain of the exact particulars: but the appearance as it struck me at the time was like that of a piece of ice when dashed on a frozen pond, which breaks to pieces and slides in various directions." He also acquaints us, that the nuclei of the spots are not always in the middle of the umbra; and gives the figure of one seen November 13th 1773, which is a remarkable instance to the contrary. Mr Dunn, however, in his new Atlas of the mundane system, gives some particulars very different from the above. "The face of the sun (says he) has frequently many large black spots, of various forms and dimensions, which move from east to west, and round the sun, according to some observations in 25 days, according to others in 26, and according to some in 27 days. The black or central part of each spot is in the middle of a great number of very small ones, which permit the light to pass between them. The small spots are scarce ever in contact with the central ones: but what is most remarkable, when the whole spot is near the limb of the sun, the surrounding small ones form nearly a straight line, and the central part projects a little over it, like Saturn in his ring."

The spots are by no means confined to one part of the sun's disk; though we have not heard of any being observed about his polar regions: and though their direction is from east to west, yet the paths they describe in their course over the disk are exceedingly different; sometimes being straight lines, sometimes curves, sometimes descending from the northern to the southern part of the disk, sometimes ascending from the southern to the northern, &c. This was observed by Mr Derham, (Philos. Trans. N^o. 330.) who hath given figures of the apparent paths of many different spots, wherein the months in which they appeared, and their particular progress each day, are marked.

Besides these spots, there are others which sometimes appear very round and black, travelling over the disk of the sun in a few hours. They are totally unlike the others, and will be shewn to proceed from an interposition of the planets Mercury and Venus between the earth and the sun. Excepting the two kinds of spots abovementioned, however, no kind of object is discoverable on the surface of the sun, but he appears like an immense ocean of elementary fire or light.

¹⁹
Telescope view of the moon.
2. With the moon the case is very different. Many darkish spots appear in her to the naked eye; and, through a telescope, their number is prodigiously increased: she also appears very plainly to be more protuberant in the middle than at the edges, or to have the figure of a globe, and not a flat circle. This protuberance, or globular figure, may also be perceived in some degree by the naked eye, when she does not shine very bright. When the moon is horned or gibbous, the one side appears very ragged and uneven,

^{3d Plate}
XLII. fig. 6.
¹⁸
Mr Dunn's account.

^{4d Plate}
XLIII. fig. 2.

but

but the other always exactly defined and circular. The spots in the moon always keep their places exactly; never vanishing, or going from one side to the other, as those of the sun do.

The astronomers Florentius, Langrenus, John Hevelius of Dantzic, Grimaldus, and Ricciolus, have drawn the face of the moon as she is seen through telescopes magnifying between two and 300 times. Particular care has been taken to note all the shining parts in her surface; and, for the better distinguishing them, each has been marked with a proper name. Langrenus and Ricciolus have divided the lunar regions among the philosophers, astronomers, and other eminent men; but Hevelius, fearing lest the philosophers should quarrel about the division of their lands, has spoiled them of their property, and given the names belonging to different countries, islands, and seas on earth, to different parts of the moon's surface, without regard to situation or figure.

We have already observed, that when the planet Mars approaches any of the fixed stars, they lose their light, and sometimes totally disappear before he seems to touch them: but it is not so with the moon; for though she very often comes in betwixt us and the stars, they preserve their lustre till immediately in seeming contact with her, when they suddenly disappear, and as suddenly re-appear on the opposite side. When Saturn, however, was hid by the moon in June 1762, Mr Dunn, who watched his appearance at the emerſion, observed a kind of faint shadow to follow him for a little from the edge of the moon's disk. This appearance is represented 6th Plate XLII. fig. 2.

3. Mercury, when looked at through telescopes magnifying about 200 or 300 times, appears equally luminous throughout his whole surface, without the least dark spot. He appears indeed to have the same difference of phases with the moon, being sometimes horned, sometimes gibbous, and sometimes shining with a full round face; but at all times perfectly well defined, without any ragged edge, and very bright.

4. Venus puts on the same appearances with the Moon, or with Mercury; only she is not so bright as the latter. Spots have sometimes been seen in her, which appeared of the nature of those in the sun; others have been observed more permanent. In 1666, October 14th, Mr Cassini observed, towards the middle of the disk of this planet, a part more luminous than the rest, and two dark spots to the westward of it. He could make nothing of his observations at that time, nor had he any opportunity of observing the spots again till April 28th 1667. At this time Venus had an horned appearance, and a quarter of an hour before sun-rising the bright spot was distant from the southern horn little more than $\frac{1}{2}$ of its diameter. Near the eastern part of the circumference he saw an oblong spot, which was nearer to the northern than the southern horn. At the rising of the sun, he perceived the bright part distant from the southern horn by $\frac{1}{2}$ of its diameter; so that it was plainly moving from south to north. He was very much surprised, however, to find, that though this spot appeared to move from south to north while it remained on the southern part of the disk, yet, when he saw it on the northern part, it was plainly moving from north to south. From frequent observation, he imagined that this bright spot finished its mo-

tion, and returned to the same place of the disk from whence it set out, in about 23 hours, though not without some irregularity. The same irregular motion he observed in the obscure spots. In 1672 and 1686, with a telescope 54 feet long, Mr Cassini thought he saw a moon, or satellite, belonging to this planet, and having the same phases with Venus herself, but not so well defined. It was not above $\frac{1}{2}$ of the diameter of Venus distant from her body. Mr Short also made the like observation some years ago.

5. Mars viewed through a telescope, sometimes appears gibbous, but never horned. He has one very large spot in his disk, which at different times changes its figure, as well as shifts its place. Dr Hook observed this spot carefully in 1665, and Mr Cassini in 1666; and the latter, by diligently continuing his observations, found it to return to the same place in the space of 24 hours and 40 minutes. Through a 36 foot telescope, made use of by Dr Hook, this planet appeared almost as big as the full moon. The phases are represented 4th Plate XLII. fig. 3.

Besides these spots, Mars sometimes appears to have darkish fillets or belts along his disk, which are called *fasciæ*, and appear parallel to his equator. The fixed stars which he approaches, suffer the same diminution of their light when observed through a telescope, as when seen by the naked eye.

6. Jupiter has the same general appearance with Mars; only that the fixed stars never suffer any diminution of light by his approaching them. In 1666, Mr Hook observed the body of Jupiter through a telescope 60 feet long, and found the apparent diameter to be about four times as great as that of the full moon. This planet has more remarkable and more distinct fasciæ than Mars, which are terminated by parallel lines. They do not, however, appear to be permanent substances, being often interrupted and broken, and sometimes vanishing entirely. In some of these belts large black spots have appeared, which moved swiftly over the disk from east to west, and returned again to the same place; those nearest the planet's equator in nine hours 56 minutes; and those nearer the poles, according to Dr Smith, in 9 hours and 50 minutes. In 1665, Mr Cassini saw a very large spot in one of Jupiter's belts, which he observed continually for the space of two years, and determined exactly the time of its appearance and disappearance. In 1672, he observed it to return to the same place from whence it had set out in one night, having had an opportunity of viewing Jupiter during 10 hours that night, and thus thoroughly ascertained himself of the exact time it took. In 1677, this spot vanished, and was not seen again till 1679: afterwards, for the space of almost three years, it continually shewed itself, and then gradually vanished; and since that time has frequently appeared and disappeared. From the year 1665, in which it first appeared, to the year 1703, it appeared and vanished no fewer than eight times. The apparent motion of these spots over the disk is very unequal when they first appear: on the eastern limb of the disk, their motion is slow, and they appear narrow; but, as they advance towards the middle, they grow broader, and their motion becomes much quicker; and when they approach the western limb, they again change their figure, and move more slowly. The belts undergo several changes with-

3^d Plate
XLII. fig. 1.

20
6th Mercury.

3^d
Venus.

22
Mars.

23
Jupiter.

Phil. Trans.
n^o 14. p. 245.

out

out being broken; sometimes becoming narrower, sometimes increasing in breadth, sometimes advancing towards each other, sometimes receding, &c.

What is most remarkable of this planet is, that it is attended by four satellites or moons, which evidently circulate round it; as they sometimes recede a little from, and then come nearer to, the disk; sometimes are hid behind the body of the planet, and then appear again on the other side, receding to a little distance, then come near and pass over it: and it is observed that when they pass between us and the disk of Jupiter, they often resemble black round spots, like Mercury and Venus passing over the disk of the sun; their shadows in the mean time travelling over the disk like other spots, having the same appearance, and marching either before or behind the satellites according to the situation of the earth and Jupiter with respect to the sun. With good telescopes, black spots have also been observed on the disks of these secondary planets themselves.

7. Saturn, the most remote of all the planets, makes a still more remarkable appearance; being encompassed with a luminous ring, represented 2^d Plate XLII. fig. 1. and Plate XLIII. fig. 5. This ring appears double when seen thro' good telescopes, as represented in the figures, and keeps always parallel to itself; by which means it disappears once every fifteen years, according to the situation of the earth and Saturn with regard to the Sun. The reason of its disappearance is, that it is turned edge-wise to us, when its thinness renders it invisible. When it begins to turn its edge towards us, it appears somewhat thicker on one side than another, and the thickest edge has been observed on different sides of the planet. On the body of Saturn, spots have likewise been sometimes seen, but much more obscurely than those of Mars or Jupiter; and no dark spots have ever been observed on his surface. This planet is attended by five moons, whose general appearances resemble those of Jupiter; only they are more obscure, and require better telescopes to discover them on account of their great distance.

8. The Comets, viewed through a telescope, have a very different appearance from any of the planets. The nucleus, or star, seems much more dim. Sturmius tells us, that observing the comet of 1680 with a telescope, it appeared like a coal dimly glowing; or a rude mass of matter illuminated with a dusky smoky light, less sensible at the extremes than in the middle; and not at all like a star, which appears with a round disk and a vivid light.

Hevelius observed of the comet in 1661, that its body was of a yellowish colour, bright and conspicuous, but without any glittering light. In the middle was a dense ruddy nucleus, almost equal to Jupiter, encompassed with a much fainter, thinner matter.—Feb. 5th. The nucleus was somewhat bigger and brighter, of a gold colour, but its light more dusky than the rest of the stars; it appeared also divided into a number of parts.—Feb. 6th. The nuclei still appeared, though less than before. One of them on the left side of the lower part of the disk appeared to be much denser and brighter than the rest; its body round, and representing a little lucid star; the nuclei still encompassed with another kind of matter.—Feb. 10th. The nuclei more obscure and confused, but brighter

at top than at bottom.—Feb. 13th. The head diminished much both in brightness and in magnitude.—March 2^d. Its roundness a little impaired, and the edges lacerated.—March 28th. Its matter much dispersed; and no distinct nucleus at all appearing.

Weigelius, who saw through a telescope the comet of 1664, the moon, and a little cloud illuminated by the sun, at the same time; observed that the moon appeared of a continued luminous surface, but the comet very different, being perfectly like the little cloud enlightened by the sun's beams.

The comets, too, are to appearance surrounded with atmospheres of a prodigious size, often rising ten times higher than the nucleus. They have often likewise different phases, like the moon. Those of 1744 and 1769 had both of them this appearance, 5th Plate XLII. fig. 6. The latter also, when viewed through a telescope, seemed to turn swiftly round on its axis, and to emit flashes or sparks of electric light from all parts of it; which sparks were instantly impelled with great violence towards the tail.

As for the tails of comets, they resemble the streams of electric light more than any thing else. That of 1769 seemed perpetually to shoot out in straight lines of a pale silver hue, lengthening and shortening at each instant, and forming frequently some of the configurations assumed by the Aurora Borealis. Dr Halley, about the year 1716, hath observed the same thing. Speaking of a remarkable Aurora Borealis, he says, "That the great streams of light so much resembled the tails of comets, that at first sight they might well be taken for such;" and afterwards adds, "This light seems to have a great affinity with that which electric bodies emit in the dark."

9. The fixed stars, when viewed through the best telescopes, appear not at all magnified, but rather diminished in bulk, by reason that the telescope takes off that twinkling appearance they make to the naked eye, and which increases their apparent magnitude. Their number, however, appears increased so prodigiously, that 70 stars have been counted in the constellation called the *Pleiades*, and no fewer than 2000 in that of *Orion*. The galaxy, or milky-way, appears in a manner made up of stars so small and so close, that they cannot be discerned singly. To these stars it owes a good part of its light, though not the whole, as some small specks called *nebulae* are discovered in the heavens, having much the same appearance, and which have not always stars within them. Of these we have the following account in the Philosophical Transactions, N^o 347. "Some of these bright spots discover no sign of a star in the middle of them; and the irregular form of those that have, shews them not to proceed from the illumination of a central body. These are six in number, all which we will describe in the order of time, as they were discovered; giving their places in the sphere of fixed stars, to enable the curious, who are furnished with good telescopes, to take the satisfaction of contemplating them.

"The first and most considerable is that in the middle of Orion's sword, marked with ϵ by Bayer in his *Uranometria*, as a single star of the third magnitude; and is so accounted by Ptolemy, Tycho Brahe, and Hevelius; but it is in reality two very contiguous stars, environed with a very large transparent bright spot, thro' which they appear with several others. These are cu-

27
Their at-
mospheres
and phases.

29
Number of
the fixed
stars increas-
ed by tele-
scopes.

29
Account of
the nebulae.

24
It's four
moons.

25
Saturn, with
his ring and
satellites.

26
Of the co-
mets.

riously described by Huygenius in his *Systema Saturninum*, p. 8. who there calls this brightness *Portentum cui certe simile aliud nusquam apud reliquas fixas potuit animadvertere*: affirming, that he found it by chance in the year 1656. The middle of this is at present in 19° with fourth lat. $28^{\circ} \frac{1}{2}$.

"About the year 1661, another of this sort was discovered by Bullialdus, in *Cingula Andromedæ*. This is neither in Tycho nor Bayer, having been omitted, as are many others, because of its smallness: but it is inserted in the catalogue of Hevelius, who has improperly called it *Nebulosa* instead of *Nebula*; it has no sign of a star in it, but appears like a pale cloud, and seems to emit a radiant beam into the north-east, as that in Orion does into the south-east. It precedes in right ascension the northern in the girdle, or *Bayero*, about a degree and three quarters, and has longitude at this time $7^{\circ} 24'$, with north lat. $33^{\circ} \frac{1}{2}$.

"The third is near the ecliptic, between the head and bow of Sagittary, not far from the point of the winter solstice. This, it seems, was found in the year 1665 by a German gentleman M. J. Abraham Ihle, whilst he attended the motion of Saturn then near his aphelion. This is small, but very luminous, and emits a ray like the former. Its place at this time is $13^{\circ} 4' \frac{1}{2}$, with about half a degree fourth lat.

"A fourth was found by Dr Edm. Halley in the year 1677, when he was making the catalogue of the southern stars. It is in the Centaur, that which Ptolemy calls α *THE TWIN HORSES*, which he names in *dorso Equino Nebula*, and is *Bayeri* α ; it is in appearance between the fourth and fifth magnitude, and emits but a small light for its breadth, and is without a radiant beam; this never rises in England, but at this time its place is $11^{\circ} 5' \frac{1}{2}$, with $35^{\circ} \frac{1}{2}$ fourth lat.

"A fifth was discovered by Mr G. Kirch in the year 1681, preceding the right foot of Antinous: It is of itself but a small obscure spot, but has a star that shines through it, which makes it the more luminous. The longitude of this is at present $13^{\circ} 9'$ *circiter*, with $17^{\circ} \frac{1}{2}$ north latitude.

"The sixth and last was accidentally hit upon by Dr Edm. Halley in the constellation of Hercules, in the year 1714. It is nearly in a right line with ϵ and ν of Bayer, somewhat nearer to ϵ than ν : and by comparing its situation among the stars, its place is sufficiently near in $11^{\circ} 26' \frac{1}{2}$, with 57° north lat. This is but a little patch; but it shews itself to the naked eye, when the sky is serene and the moon absent."

Sect. III. Conclusions from the foregoing Appearances, and Conjectures concerning them.

³⁰ Few conclusions to be drawn with certainty. FROM the abovementioned appearances, either with the naked eye, or through telescopes, the conclusions that can be drawn with certainty are very few, and may be reduced to the following: 1. Mercury and Venus are between the earth and the sun, circulating round him as the moon does round the earth: Mars, Jupiter, and Saturn, are at a greater distance, including the earth also in their orbit. This appears from these two planets putting on the phases of the moon; and from Mars, Jupiter, and Saturn, never doing so: from which, and from the apparent irregularity of the pla-

nets motions, the motion of the earth necessarily follows, as shall be afterwards more fully explained. 2. The planets Jupiter and Mars revolve on their axis, or turn round, the one in about 9 hours 56 minutes, the other in 24 hours 40 minutes. With regard to Venus, the case is doubtful. From Mr Cassini's observations, it might be inferred, that, if she revolves at all, it is in somewhat more than 23 hours; but, according to the later observations of M. Bianchini, she revolves only in 24 days 8 hours. As to Mercury and Saturn, as no spots have ever been observed on their disk, nothing can be advanced concerning their revolutions. 3. From the motion of the solar spots from east to west, it hath been concluded that he revolves round his axis in the same direction. This, however, we humbly apprehend, may be justly disputed, for the following reason. If the apparent motion of the solar spots depended on his rotation round his axis, then all their apparent paths behaved to be parallel to one another; which they are not, as must be evident from the figures we have given. We acknowledge, that an inclination of the sun's axis to the ecliptic must make them describe paths, at some times of the year, which must deviate from parallelism to those described at other times, in proportion to the quantity of the angle of inclination: but still, at the same times of the year, their paths ought to be parallel to one another; and this, it is manifest from looking at the figures, they are not. Among the paths of those marked by Mr Derham the greatest inequalities in this respect are to be observed, whether we compare them with one another, or with that of the spots in 1769 by Dr Wilson; (see 2^d Plate XLII. fig. 1.)—How far this may deserve attention, we submit to the consideration of the learned. 4. The moon and planets are all opaque bodies, of a globular figure, which shine not by their own light, but by the reflection of that of the sun.

The conjectures which have been formed concerning the nature of the celestial bodies are so numerous, that a recital of them would fill a volume; while at the same time many of them are so ridiculous, that absurdity itself would seem almost to have been exhausted on this subject.

As a specimen of what were the opinions of the ancient philosophers concerning the nature of the sun, it may suffice to mention, that Anaximander and Anaximenes held, that there was a circle of fire all along the heavens, which they called the *circle of the sun*; between the earth and this fiery circle was placed another circle of some opaque matter, in which there was a hole like the mouth of a German flute. Through this hole the light was transmitted, and appeared to the inhabitants of this earth as a round and distinct body of fire. The eclipses of the sun were occasioned by stopping this hole.

We must not, however, imagine, that the opinions of all the ancients were equally absurd with those of Anaximander and Anaximenes. Many of them had more just notions, tho' very imperfect and obscure. Anaxagoras held the sun to be a fiery globe of some solid substance, bigger than Peloponnesus; and many of the moderns have adopted this notion, only increasing the magnitude of the globe prodigiously. Sir Isaac Newton has propounded it as a query, Whether the sun and fixed stars are not great *Earths* made vehemently hot, whose

³¹ Opinions of the ancients concerning the sun.

³² Of Sir Isaac Newton.

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Conjectures
concerning
the Solar
spots.

whose parts are kept from fuming away by the vast weight and density of their superincumbent atmospheres, and whose heat is preserved by the prodigious action and reaction of their parts upon one another? Agreeable to this idea, Mr Derham and many others have formed conjectures concerning the solar spots, taking them for the smoke of new volcanoes breaking out in that fiery body; which smoke, being more dense towards the middle, and more rare towards the edges, gives the appearance of a nucleus and umbra. Many, however, are of opinion that they are only exhalations raised by the intense heat of the sun, and consequently a kind of clouds flying in his atmosphere. Some have taken them for planets nearer the sun than Mercury; but this their perishableness will by no means allow us to believe. Others have imagined, that they were new and unformed worlds in a chaotic state, as our earth originally was. In the abovementioned dissertation, Dr Wilson is of opinion, that the solar spots are vast cavities in the body of the sun himself, and even gives the following method for measuring their depth. "All the foregoing appearances, when taken together, and when duly considered, seem to prove in the most convincing manner, that the nucleus of this spot (December 1769) was considerably beneath the level of the sun's spherical surface.

34
Dr Wilson's
opinion.

"The next thing which I took into consideration, was to think of some means whereby I could form an estimate of its depth. At the time of the observation I had on Dec^r 12th, I had remarked that the breadth of the side of the umbra next the limb was about 14"; but, for determining the point in question, it was also requisite to know the inclination of the shelving side of the umbra to the sun's spherical surface. And here it occurred, that, in the case of a large spot, this would in some measure be deduced from observation. For, at the time when the side of the umbra is just hid, or begins first to come in view, it is evident, that a line joining the eye and its observed edge, or uppermost limit, coincides with the plane of its declivity. By measuring therefore the distance of the edge from the limb, when this change takes place, and by representing it by a projection, the inclination or declivity may in some measure be ascertained. For in fig. 2. let ILDK be a portion of the sun's limb, and ABCD a section of the spot, SL the sun's semidiameter, LG the observed distance from the limb, when the side of the umbra changes, then will the plane of the umbra CD coincide with the line EDG drawn perpendicular to SL at the point G. Let FH be a tangent to the limb at the point D, and join SD.

4th Plate
XLII.

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His method
of measur-
ing their
depth.

"Since GL, the vertical line of the angle LSD, is given by observation, that angle is given, which by the figure is equal to FDE, or GDH; which angle is therefore given, and is the angle of inclination of the plane of the umbra to the sun's spherical surface. In the small triangle therefore CMD, which may be considered as rectangular, the angle MDC is given, and the side DC equal to AB is given nearly by observation; therefore the side MC is given, which may be regarded as the depth of the nucleus without any material error.

"I had not an opportunity, in the course of the foregoing observations, to measure the distance GL, not having seen the spot at the time when either

of the sides of the umbra changed. It is, however, certain, that when the spot came upon the disk for the second time, this change happened some time in the night between the 11th and 12th of December, and I judge that the distance of the plane of the umbra, when in a line with the eye, must have been about 1' 55" from the sun's eastern limb; from which we may safely conclude, that the nucleus of the spot was, at that time, not less than a semidiameter of the earth below the level of the sun's spherical surface, and made the bottom of an amazing cavity, from the surface downwards, whose other dimensions were of much greater extent."

Having thus established it, as an absolute certainty, that the solar spots are vast cavities in the sun, the Doctor next proceeds to offer some queries and conjectures concerning the nature of the sun himself, and to answer some objections to his hypothesis, which it must be confessed is somewhat uncommon. He begins with asking, Whether it is not reasonable to think, that the vast body of the sun is made up of two kinds of matter very different in their qualities; that by far the greatest part is solid and dark; and that this dark globe is encompassed with a thin covering of that resplendent substance, from which the sun would seem to derive the whole of his vivifying heat and energy. —This, if granted, will afford a satisfactory solution of the appearance of spots; because, if any part of this resplendent surface shall be by any means displaced, the dark globe must necessarily appear; the bottom of the cavity corresponding to the nucleus, and the shelving sides to the umbra. The shining substance, he thinks, may be displaced by the action of some elastic vapour generated within the substance of the dark globe. This vapour, swelling into such a volume as to reach up to the surface of the luminous matter, would thereby throw it aside in all directions; and as we cannot expect any regularity in the production of such a vapour, the irregular appearance and disappearance of the spots is by that means accounted for; as the reflux of the luminous matter must always occasion the dark nucleus gradually to decrease, till at last it becomes indistinguishable from the rest of the surface.

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His conjectures
concerning the
nature of
the sun.

Here an objection occurs, viz. That, on this supposition, the nucleus of a spot whilst on the decrease should always appear nearly circular, by the gradual descent of the luminous matter from all sides to cover it. But to this the Doctor replies, that in all probability the surface of the dark globe is very uneven and mountainous, which prevents the regular reflux of the shining matter. This, he thinks, is rendered very probable by the enormous mountains and cavities which are observed in the moon; and why, says he, may there not be the same on the surface of the sun? He thinks his hypothesis also confirmed by the dividing of the nucleus into several parts, which might arise from the luminous matter flowing in different channels in the bottom of the hollow. —The appearance of the umbra after the nucleus is gone, he thinks, may be owing to a cavity remaining in the luminous matter, tho' the dark globe is entirely covered.

As to a motion of the spots, distinct from what they are supposed to receive from the rotation of the sun round his axis, he says he never could observe any, except what might be attributed to the enlargement or diminution of them when in the neighbourhood of one

another. "But," says he, "what would further contribute towards forming a judgement of this kind is, the apparent alteration of the relative place, which must arise from the motion across the disk on a spherical surface, a circumstance which I am uncertain if it has been sufficiently attended to." This is the circumstance from which we deduced the objection against the sun's motion; and from comparing the figures given by Mr Derham and others, we cannot help thinking that it hath never been attended to as it ought.

The abovementioned hypothesis, the Doctor thinks, is further confirmed by the disappearance of the umbra on the sides of spots contiguous to one another; as the action of the elastic vapour must necessarily drive the luminous matter away from each, and thus as it were accumulate it between them, so that no umbra can be perceived. As to the luminous matter itself, he conjectures, that it cannot be any very ponderous fluid, but that it rather resembles a dense fog which broods on the surface of the sun's dark body. His general conclusion being somewhat extraordinary, we shall give it in his own words.

"According to the view of things given in the foregoing queries, there would seem to be something very extraordinary in the dark and unignited state of the great internal globe of the sun. Does not this seem to indicate that the luminous matter that encompasses it derives not its splendour from any intensity of heat? For, if this were the case, would not the parts underneath, which would be perpetually in contact with that glowing matter, be heated to such a degree, as to become luminous and bright? At the same time it must be confessed, that although the internal globe was in reality much ignited, yet when any part of it forming the nucleus of a spot is exposed to our view, and is seen in competition with a substance of such amazing splendour, it is no wonder that an inferior degree of light should, in these cases, be unperceivable.

37
Experiment
proposed in
order to con-
firm his hy-
pothesis.

"In order to obtain some knowledge of this point, I think an experiment might be tried, if we had an opportunity of a very large spot, by making a contrivance in the eye-piece of a telescope, whereby an observer could look at the nucleus alone with the naked eye, without being in danger of light coming from any other part of the sun. In this case, if the observer found no greater splendour than what might be expected from a planet very near the sun, and illumined by as much of his surface as corresponds to the spot's umbra, we might reasonably conclude, that the solar matter, at the depth of the nucleus, is in reality not ignited. But from the nature of the thing, doth there seem any necessity for thinking that there prevails such a raging and fervent heat as many have imagined? It is proper here to attend to the distinction betwixt this shining matter of the sun, and the rays of light which proceed from it. It may perhaps be thought, that the reaction of the rays upon the matter, at their emission, may be productive of a violent degree of heat. But whoever would urge this argument in favour of the sun being intensely heated, as arising from the nature of the thing, ought to consider that all polished bodies are less and less disposed to be heated by the action of the rays of light, in proportion as their surfaces are more polished, and as their powers of reflection are brought to a greater degree of perfection. And is there not a strong ana-

logy betwixt the reaction of light upon matter in cases where it is reflected, and in cases where it is emitted?"

With regard to this hypothesis, a decisive argument against it is what we have already taken notice of from Mr Wollaston, (Phil. Trans. Vol. LXIV. p. 337), if his assertion be just, that the appearance of an hollow in the body of the sun, on which the Doctor founds his arguments, is not constant. To himself, he says, they had the appearance of hollows in the tops of volcanoes. Mr Marshall of Pennsylvania too, in a letter to Dr Franklin, gives it as his opinion, that the spots are near, if not closely adhering to, the sun's surface; and tells us, that he never observed the same spot appear again on the eastern limb, in the same figure and position. At any rate, Dr Wilson's hypothesis seems exceptionable for the following reasons.

1. The notion of a shelving declivity formed in a fluid substance by an elastic vapour, is utterly irreconcilable with the nature of any fluid with which we are acquainted. If we suppose the luminous matter of the sun to have any kind of fluidity analogous to that of water, melted metals, &c. we know that a discharge of elastic vapour through them could occasion nothing but a prodigious bubbling: or if we suppose the vapour to issue with immense force, perhaps a round spot might be formed, but without any umbra, as the expansive power must decrease every moment after getting vent, and the fluid would contract the orifice on all sides, till a round mouth was left just sufficient to allow the emission of the quantity of vapour generated. If the luminous matter is supposed to be endowed with any degree of viscosity, the same effect must happen in a greater degree; and it is impossible that any shelving cavity could be produced. With regard to a fog, as it is not a fluid *per se*, but a multitude of aqueous particles floating in our atmosphere, if we compare the luminous matter of the sun to these aqueous particles, we must also suppose them swimming in some other fluid; and, at any rate, the *shelving* sides of a cavity of fog appear inconsistent, and also its running in channels in the bottom of a hollow, which last the Doctor gives as a reason for the breaking of the nucleus of a spot in pieces.

2. The vulgar prejudice in favour of the immense heat at the body of the sun seems to be extremely well founded, because we know of no substance that emits a bright white light like the sun, but what is also capable of burning very violently. We see the effect of the rays of the sun himself in burning mirrors *, which exceed any degree of heat we can raise by other means. No plausible reason can therefore be given why the heat should not increase in proportion as we come near the sun. Sir Isaac Newton hath clearly been of this opinion; and we apprehend it must be the opinion of every person who is resolved not to reject the evidence of sense entirely. At the outer surface of the luminous matter of the sun, therefore, any solid body must be heated beyond all imagination, by the intensity of the light proceeding from that matter. Now, we know that light is emitted from luminous bodies in all directions, down as well as up, and backward as well as forward. If a most violent heat behaved to take place at the outer surface of the luminous matter, the same must take place at the inner surface also, which is contiguous to the dark globe of the sun according to the Doctor's supposition. It is impossible then to imagine, that a globe

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Reasons in
opposition
to his hypo-
thesis.

* See the ar-
ticle Burn-
ing glass.

globe of any solid matter could have resisted for near 6000 years such a violent heat, without being in a state of ignition more violent than we can have any idea of.

On the whole, we cannot help thinking, that, with regard to the solar spots, no reasonable hypothesis hath been yet formed. Those who think they are the smoke of volcanoes, or clouds exhaled from the body of the sun, ought first to prove that the sun hath a solid body like our earth. It is true, we cannot produce fire on this earth without terrestrial fuel: but this is no reason why it cannot be done in the celestial spaces; on the contrary, we have the most convincing proofs that it really can be done. The explosions of electrical batteries, flashes of lightning, and some kinds of meteors, resemble the bright light of the sun much more than any fire we can make with our fuel. It is true, these are momentary, and it is proper they should be so for the safety of this world and its inhabitants: but this is no reason for supposing that there is not a natural cause sufficient for the preservation of a pure flame of that kind where it is proper it always should exist; and if this should be granted, the body of the sun may reasonably enough be supposed only to consist of elementary fire or light.

Concerning the moon, it is allowed on all hands, that there are prodigious inequalities on her surface. This is proved by looking at her through a telescope, at any other time than when she is full: for then there is no regular line bounding light and darkness; but the confines of these parts appear as it were toothed and cut with innumerable notches and breaks; and even in the dark part, near the borders of the lucid surface, there are seen some small spaces enlightened by the sun's beams. Upon the fourth day after new moon, there may be perceived some shining points like rocks or small islands within the dark body of the moon; but not far from the confines of light and darkness there are observed other little spaces which join to the enlightened surface, but run out into the dark side, which by degrees change their figure, till at last they come wholly within the illuminated face, and have no dark parts round them at all. Afterwards many more shining spaces are observed to arise by degrees, and to appear within the dark side of the moon, which before they drew near to the confines of light and darkness were invisible, being without any light, and totally immersed in the shadow. The contrary is observed in the decreasing phases, where the lucid spaces which joined the illuminated surface by degrees recede from it, and after they are quite separated from the confines of light and darkness, remain for some time visible, till at last they also disappear. Now it is impossible that this should be the case, unless these shining points were higher than the rest of the surface, so that the light of the sun may reach them.

Not content with perceiving the bare existence of these lunar mountains, astronomers have endeavoured to measure their height in the following manner. Let EGD be the hemisphere of the moon illuminated by the sun, ECD the diameter of the circle bounding light and darkness, and A the top of a hill within the dark part when it first begins to be illuminated. Observe with a telescope the proportion of the right line AE, or the distance of the point A from the lucid surface to the diameter of the moon ED; and, because in this

case the ray of light ES touches the globe of the moon, AEC will be a right angle by 16 prop. of Euclid's third book; and therefore in the triangle AEC having the two sides AE and EC, we can find out the third side AC; from which subtracting BC or EC, there will remain AB the height of the mountain. Ricciolus affirms, that upon the fourth day after new moon he has observed the top of the hill called *St Catharine's* to be illuminated, and that it was distant from the confines of the lucid surface about a sixteenth part of the moon's diameter. Therefore, if $CE=8$, AE will be 1, and $AC^2=CE^2+AE^2$ by prop. 47. of Euclid's first book. Now, the square of CE being 64, and the square of AE being 1, the square of AC will be 65, whose square root is 8,062, which expresses the length of AC. From which deducting BC=8, there will remain AB=0,062. So that CB or CE is therefore to AB, as 8 is to 0,062, that is, as 8000 is to 62. If the diameter of the moon therefore was known, the height of this mountain would also be known. This demonstration is taken from Dr Keil, who supposes the semidiameter of the moon to be 1182 miles; according to which, the mountain must be somewhat more than nine miles of perpendicular height: but astronomers having now determined the moon's semidiameter to be only 1090 miles, the height of the mountain will be nearly 8½ miles.

Here we cannot help remarking, that it is extremely improbable such enormous mountains should exist in so small a planet. The abovementioned height is almost three times what is allowed to the highest mountains on earth; and it is certainly altogether contrary to the proportions and analogy wisely observed throughout nature, to imagine that the moon should have hills 8½ miles high, while the earth, which is more than 40 times as large, should have none exceeding three miles in height. At any rate, the extreme disagreement and contradiction among geometricians with regard to the height of terrestrial mountains, must make all their calculations concerning the heights of lunar ones appear still less worthy of credit.

Concerning the nature of the moon's substance there have been many conjectures formed. Some have imagined, that, besides the light reflected from the sun, the moon hath also some obscure light of her own, by which she would be visible without being illuminated by the sun-beams. In proof of this it is urged, that during the time of even total eclipses the moon is still visible, appearing of a dull red colour, as if obscured by a great deal of smoke. In reply to this it hath been advanced, that this is not always the case; the moon sometimes disappearing totally in the time of an eclipse, so as not to be discernible by the best glasses, while little stars of the fifth and sixth magnitudes were distinctly seen as usual. This phenomenon was observed by Kepler twice, in the year 1580 and 1583; and by Hevelius in 1620. Ricciolus and other Jesuits at Bologna, and many people throughout Holland, observed the same on April 14th, 1642; yet at Venice and Vienna, she was all the time conspicuous. In the year 1703, Dec 23, there was another total obscuration. At Arles, she appeared of a yellowish brown; at Avignon, ruddy and transparent, as if the sun had shone through her: at Marçilles, one part was reddish and the other very dusky; and at length,

39
The spots on the sun not so factually accounted for.

40
Great inequalities on the surface of the moon.

41
Method of measuring the lunar mountains. 3d Plate XLII. fig. 1.

42
Conjectures concerning her surface.

though in a clear sky, she totally disappeared. The general reason for her appearance at all during the time of eclipses shall be given afterwards : but as for these particular phenomena, they have not yet, as far as we know, been satisfactorily accounted for ; and indeed astronomers in general seem industriously to avoid speaking of them.

Different conjectures have also been formed concerning the spots on the moon's surface. Some philosophers have been so taken with the beauty of the brightest places observed in her disk, that they have imagined them to be rocks of diamonds ; and others have compared them to pearls and precious stones. Dr Keil and the greatest part of astronomers now are of opinion that these are only the tops of mountains, which by reason of their elevation are more capable of reflecting the sun's light than others which are lower. The dusky spots, he says, cannot be seas, nor any thing of a liquid substance ; because when examined by the telescope, they appear to consist of an infinity of caverns and empty pits, whose shadows fall within them, which can never be the case with seas, or any liquid substance : but, even within these spots, brighter places are also to be observed ; which, according to his hypothesis, ought to be the points of rocks standing up within the cavities.

On the other side, it has been urged, that if all the dark spots observed in the moon's surface were really the shadows of mountains, or of the sides of deep pits, they could not possibly be so permanent as they are found to be, but behaved to vary according to the position of the moon with regard to the sun, as we find shadows on earth are varied according as the earth is turned towards or from the sun. Accordingly it is pretended, that variable spots are actually discovered on the moon's disk, and that the direction of these is always opposite to the sun. Hence they are found among those parts which are soonest illuminated in the increasing moon, and in the decreasing moon lose their light sooner than the intermediate ones ; running round, and appearing sometimes longer, and sometimes shorter. The permanent dark spots, therefore, it is said, must be some matter which is not fitted for reflecting the rays of the sun so much as the bright parts do ; and this property, we know by experience, belongs to water rather than land : whence these philosophers conclude, that the moon, as well as our earth, is made up of land and seas.

It hath been much disputed whether there is about the moon any kind of atmosphere similar to what we breathe. Against the existence of this it hath been urged, that the moon constantly appears with the same lustre when there are no clouds in our air ; which could not be expected, were she surrounded with an atmosphere like ours, the different changes of which behaved sometimes to diminish and at other times to increase her lustre. The strongest argument, however, is drawn from the refractive power of our atmosphere, which is well known to have a great influence on the rays of light proceeding either from celestial or terrestrial bodies, so as to cause them deviate from a straight line, and of consequence behaved to have the same effect on those which passed through the atmosphere of the moon, if any such there was. But no such effect has ever been perceived. The smallest fixed stars, as hath been already observed, preserve their lustre undiminished till they are suddenly covered by the moon's limb, and as suddenly appear on

the other side, without being at all affected by their approach to her, as they are by the planet Mars. For this reason, too, the same philosophers maintain, that there can neither be clouds nor rain in the lunar regions, but that she enjoys a perpetual and uninterrupted serenity.

To these arguments it hath been replied, 1. That the appearances on which they are founded are not constant. Hevelius writes, that he has several times found in skies perfectly clear, when even stars of the sixth and seventh magnitude were visible, that at the same altitude of the moon, and the same elongation from the earth, and with one and the same telescope, the moon and its maculæ do not appear equally lucid, clear, and conspicuous, at all times ; but are much brighter and more distinct at some times than at others. From the circumstances of this observation, say they, it is evident that the reason of this phenomenon is not either in our air, in the tube, in the moon, or in the spectator's eye ; but must be looked for in something existing about the moon. Along with this, the phenomena already mentioned of the different appearances of the moon in the total eclipses are also urged, and are derived from the different constitutions of the lunar atmosphere at that time. Cassini frequently observed Saturn, Jupiter, and the fixed stars, to have their circular figure changed into an elliptical one, when they approached either the illuminated or dark edge of the moon's limb, and in other occultations found no change of figure at all. Mr Dunn particularly viewed Saturn at his emergence from behind the moon, in order to determine this question ; and the appearance which he then observed, inclined him to think there was an atmosphere about the moon. 2. In the total eclipses of the sun, we find the moon encompassed with a lucid ring parallel to her periphery. Of this we have too many observations to doubt : In the great eclipse of 1713, the ring was very visible at London and elsewhere. The same was observed by Kepler in 1605, at Naples and Antwerp. Wolfius relates the same of an eclipse in 1606 at Leipzig, which is described at large in the *Acta Eruditorum*, with this notable circumstance, that the part next the moon was visibly the most illuminated, being considerably brighter than that furthest from it ; which is also confirmed by the observations of the French astronomers in 1706.

For these reasons, it is concluded by many, that there is about the moon some fluid, which conforms itself to her figure, and is more dense near her surface than at a distance from it, and that it both reflects and refracts the rays of the sun. It is also concluded, that the lunar atmosphere is not always in the same state, as it sometimes changes the figures of the stars, and sometimes not : and in the several eclipses just mentioned, there was observed a trembling of the moon's limb immediately before immersion, with an appearance of thin smoke flying over it during immersion, very visible in England. Hence, as these phenomena are observed to happen in our atmosphere when full of vapours, it is concluded that the lunar atmosphere has been in a similar state at these times : and since at other times these appearances are not to be observed, it is thought that then the lunar air has been clear and transparent, by reason of rain, dew, or snow, having fallen.

The strongest argument for a lunar atmosphere is that drawn from the luminous ring around her in solar eclipses ;

eclipses; and this seems so conclusive, that Dr Halley himself was almost convinced of the existence of such an atmosphere by it. He tells us, however, that several very great astronomers did not think such a thing at all probable. Other astronomers have imagined that it proceeded from a solar atmosphere, because it followed the centre of the sun, and not that of the moon. Some there are who ridicule both these opinions, and take this appearance to be an undeniable proof of the moon's being included within the atmosphere of the earth. We observe, say they, at all times, when the sky is clear, the body of the sun to be surrounded with a very bright and dazzling circle, which extends to a considerable distance, and whose centre always coincides with that of the sun. This circle we never ascribe to the atmosphere of the sun, but to that of the earth. If the sun is hid by a mountain, part of this circle continues visible after his body disappears; and that part of the luminous circle is brightest, which is apparently nearest the mountain: yet we never ascribe this to the atmosphere of the mountain, but to the common atmosphere of the earth which lies beyond the mountain. In the case of solar eclipses, therefore, why should we imagine the luminous circle to proceed from any thing else than that part of the earth's atmosphere which lies beyond the moon? In this case, it will also follow the centre of the sun; and the tremulations of that part of our atmosphere lying between us and the moon being observed by means of the sun's strong light, will occasion the apparent tremulation of the moon's limb already taken notice of at the time of immersion. To have recourse in this case, say they, to such an *emendationis* as the solar or lunar atmosphere, is truly solving *obscurum per obscurius*. As for the small refractions of the light of the planets and fixed stars which have sometimes been observed when they approach the moon's limb, the abovementioned persons think they may be reasonably accounted for on the same principles with the tides; namely, by an accumulation of the aqueous vapours floating in our atmosphere under that part of the heavens where the moon is; and consequently the light of the stars will be more or less refracted, according as it passes through a larger or lesser quantity of the accumulated vapour. This last hypothesis might give some encouragement to bishop Wilkins's scheme of flying to the moon, which the want of a continued atmosphere between that luminary and the earth would be an effectual bar against: but tho' we should suppose the art of flying possible, and likewise that the air all the way up were fit for supporting our life, the bishop's journey would be rather too long; for allowing him to fly 60 miles an hour, and to proceed day and night without intermission, he must be five months before he came to his journey's end, supposing the moon's mean distance 240,000 miles, as it is commonly thought to be.

⁴⁴
Conjectures
concerning
the planets.

With regard to the planets Mercury, Venus, Mars, Jupiter, and Saturn, few conjectures have been formed: only that the temperature of the two inferior ones, Mercury and Venus, must be much hotter, and that of the superior ones, Mars, Jupiter, and Saturn, considerably colder, than that of the earth. That the latter are much less enlightened than this earth, we are absolutely certain: but whether they are not encompassed with atmospheres, which prevent them from suffering any

violent excess of cold, we are entirely ignorant; as well as whether those of Mercury and Venus may not diminish the heat which at first would appear to be so violent at the small distances from the sun at which they circulate. Mars, we are certain, has an atmosphere about his body which is capable of refracting and absorbing the light of other stars; but what its other properties are, we have no means of knowing. The spots on Venus, Mr Dunn informs us, are thought to be seas. The belts observable on the superior planets have occasioned much speculation. Some have thought that they were inherent on the surfaces of the planets; and thus some philosophers have said, that greater changes take place on the body of the planet Jupiter, than what would happen to this earth were the ocean and dry land to change places. Others, however, have imagined that they are similar to our clouds: but their constant appearance seems contradictory to such a supposition; for tho' it is true that they are but of a transitory nature, they are vastly more permanent than any clouds to be observed on earth. For this reason, some have imagined that they are only certain parts of the atmosphere of the planet of a different constitution, and less capable of transmitting the sun's light than others. These dark zones, they think, may have arisen from the superior planets enjoying a perpetual equinox, the reason of which shall be given when we come to speak of the causes of the different seasons on earth. The moons of Jupiter and Saturn, and the ring with which the latter is surrounded, are thought to be designed for reflecting the sun's light upon these planets; and their number is imagined to be sufficient to compensate in some measure for the great distance at which they are placed from the sun.

We cannot conclude this article without taking notice, that astronomers seem not to be agreed whether the belts of Jupiter are really darker or brighter than the rest of his disk. In Chambers's Dictionary, we have the following account of them, under the word *Fasciæ*. "Fasciæ, in astronomy, two rows of bright spots, observed on Jupiter's body; appearing like swaths, or belts. The fasciæ or belts of Jupiter are more lucid than the rest of his disk, and are terminated by parallel lines. They are sometimes broader, and sometimes narrower; nor do they always possess the same part of the disk. M. Huygens, likewise, observed a very large kind of fascia in Mars; but it was darker than the rest of the disk, and took up the middle part thereof." Most of the astronomical writers, at least the more common ones, seem to be pretty silent on the subject, but generally incline us to think that they are dark. In Mr Wollaston's paper already quoted from Phil. Trans. Vol. LXIV. he mentions both bright and dark belts.

With regard to comets, innumerable conjectures have been formed. The ancients in general were of opinion that they were meteors formed in our atmosphere, only of a more permanent substance than the common ones; and that they were signs of the wrath of God: which last opinion hath been preferred among the vulgar to this day. Some, however, thought otherwise; and asserted them to be a kind of planets that revolved round the sun, but in more extensive circles than the others: but these were few in number; and the general opinion of their being signs of divine wrath, and pre-

⁴⁵
Uncertainty
concerning
the appearance
of Jupiter's belts.

⁴⁶
Of Comets.

47
Kepler and
Bodin's op-
inion of
them.

sages of terrible calamities to mankind, prevailed till the revival of learning in the 16th century.

It was not, however, till some time after people began to throw off the fetters of superstition and ignorance which had so long held them, that any rational hypothesis was formed concerning comets. Kepler, in other respects a very great genius, indulged the most extravagant conjectures, not only concerning comets, but the whole system of nature in general. The planets he imagined to be huge animals who swam round the sun by means of certain fins acting upon the ethereal fluid, as those of fishes do on the water; and agreeable to this notion, he imagined the comets to be monstrous and uncommon animals generated in the celestial spaces; and he explained how the air engendered them by an animal faculty. A yet more ridiculous opinion, if possible, was that of John Bodin, a learned man of France in the 16th century. He maintained that comets "are spirits, which having lived on the earth innumerable ages, and being at last arrived on the confines of death, celebrate their last triumph, or are recalled to the firmament like shining stars! This is followed by famine, plague, &c. because the cities and people destroy the governors and chiefs who appease the wrath of God." This opinion, ridiculous as it is, he says he borrowed from the philosopher Democritus, who imagined them to be the souls of famous heroes: but this opinion being irreconcilable with Bodin's Christian sentiments, he was obliged to suppose them to be a kind of geni, or spirits subject to death, like those so much mentioned in the Mahometan fables. Others, again, have denied the existence of comets, and maintained that they were only false appearances occasioned by the refraction or reflection of light; as if the light could refract or reflect of itself, without any substance from whence it was so reflected or refracted.

48
Bernoulli's
opinion.

The first rational conjecture we meet with is that of James Bernoulli, an Italian astronomer, who imagined them to be the satellites of some very distant planet, which was invisible to us on account of its distance, as were also the satellites unless when in a certain part of their course. But though we call this a rational conjecture, in comparison of the others, it is nevertheless very absurd; as it supposes a satellite to leave its primary planet in darkness, in order to enlighten other orbs with which it has nothing to do.

49
Opinions of
Newton
Halley, &c.

The first rate astronomers of England, as Newton, Flamsteed, Halley, &c. have been perfectly satisfied that the comets were a kind of planets which revolved round the sun in very eccentric ellipses; and have accordingly calculated the returns of some of them, and made conjectures concerning the use they may probably be of in the general system of nature. Cassini and some of the French philosophers thought this opinion highly probable; but De La Hire and others opposed it. The whole event of the dispute, however, it is plain, behoved to turn on the observation of the return of comets, and the calculation of their periodical times like those of other planets; which, whenever it was fully done, behoved to put the matter beyond a doubt: but until this was done, not at once or twice, but a great number of times, there behoved still to be an uncertainty, let the arguments for their return be supposed as probable as we please. This Sir Isaac Newton and Dr Halley attempted to do. Having observed the

accounts of comets in history, and found some of them to appear at equal intervals of time, it was concluded that these were the same comets, and would appear again after an interval of equal length. Thus, Sir Isaac Newton having observed a comet in the year 1680, of great apparent magnitude; and found that such an one had appeared before, at an interval of 575 years between each appearance; he concluded that these were different appearances of the same comet, and that it would again appear 575 years afterwards. The same celebrated philosopher, along with Dr Halley and others, calculated the period of the comet which appeared in 1682, and found that it ought to appear again in the year 1758, its periodical time being about 75½ years. The most important objection that arose to the return of this comet, was the inequality of its periods, which were as follows: "That from August 25th 1531, to the 26th of October 1607, was performed in 76 years and two months; that from October 26th 1607, to September 14th 1682, was rather less than 75 years; and its last period, from the 14th of September 1682, to the 13th of March 1759, which was the longest of all, was 76 years and six months, or 27,937 days, amounting to 583 days more than in the preceding period.

50
History of the comet
1682.

Hist. of Co-
mets, p. 63.

"Dr Halley was aware of these differences, and at first confessed himself to be a little staggered by them; nor would he have had the courage to pronounce its return so positively, if history had not informed him, that comets had appeared in 1456, 1380, and 1305, which put their identity out of all doubt.

"The appearances happening alternately in 75 and 76 years, and as the preceding period was only of 75 years, it was natural to suppose that the next would amount to 76. But as the difficulties arising from these inequalities in the periods were foreseen and obviated by Dr Halley, we cannot do better than to insert his own words.

"Perhaps some may object to the diversity of their inclinations and periods, which is greater than what is observed in the revolutions of the same planet; seeing one period exceeded the other by more than the space of one year, and the inclination of the comet of the year 1682 exceeded that of the year 1607 by 22 entire minutes. But let it be considered what I mentioned at the end of the tables of Saturn, where it was proved that one period of that planet is sometimes longer than another by 13 days; and that is evidently occasioned by the force of gravity tending towards the centre of Jupiter, which force indeed in equal distances is only the 1000th part of that force tending to the sun itself, by which the planets are retained in their orbits. But by a more accurate computation, the force of Jupiter upon Saturn, for example, in the great conjunction as they call it, January 26, in the year 1683, was found to be to the force of the sun upon the same Saturn, as 1 to 186; the sum of the forces therefore is to the force of the sun, as 187 to 186. But at the same distance from the centre, the periodic times of bodies revolving in a circle are in the subduplicate ratio of the forces with which they are urged: therefore the gravity being increased by the 186th part of itself, the periodical time will be shortened by about the 374th part, that is by a whole month in Saturn. How much more is a comet liable to these errors, which makes its excursion

near

near four times higher than Saturn; and whose velocity being increased by less than the 120th part of itself, would change its elliptic orbit into a parabolic trajectory?

‘ But it happened in the summer of 1681, that the comet seen in the following year, in its descent towards the sun, was in conjunction with Jupiter in such a manner, and for several months so near him, that during all that time it must have been urged likewise towards the centre of Jupiter with near the 50th part of that force by which it tended towards the sun: whence, according to the theory of gravity, the arc of the elliptic orbit, which it would have described had Jupiter been absent, must be bent inwards towards Jupiter in an hyperbolic form winding, and have assumed a kind of curve very compounded, and as hitherto not to be managed by the geometrics; in which the velocity and direction of the moving body, in proportion to the cause, would be very different from what it otherwise had been in the ellipses.

‘ Hence a reason may be assigned for the change of its inclination: for as the comet in this part of its path had Jupiter on the north almost in a perpendicular direction to its path, that portion of its orbit must be bent towards that quarter; and therefore its tangent being inclined to a greater angle towards the plane of the ecliptic, the angle of the inclination of the plane itself must be necessarily increased. Besides the comet continuing long in the neighbourhood of Jupiter, after it had come towards him from parts much more remote from the sun with a slower motion, and now being urged with the joint central forces of both, must have acquired more accelerated velocity, than it could lose in its recess from Jupiter by forces acting a contrary way, its motion being more swift, and the time being less.’

‘ When the comet of 1682 descended towards the sun and became visible, Europe had scarce recovered from the terrible panic into which it had been thrown but 18 months before by the great comet. However, this was comparatively too inconsiderable to be much regarded; for it was little imagined then, that the least of the two would become the most interesting, and that it would be for ever celebrated by posterity for having taught mankind how to know all the rest. But however inferior to the other this comet may have appeared in vulgar eyes, astronomers observed it with the greatest attention. Hevelius at Dantzick, Kitch at Leipzig, Flamsteed and Halley in England, Zimmermann at Nuremberg, Baert at Toulon, Montanori at Padua, and Picard, Cassini, and la Hire, at Paris. This list of names will suffice to shew that there can be no scarcity of good observations upon this comet during that appearance.

‘ In 1607 it was observed by the famous Kepler, who published his observations together with his general theory. The 16th of September old style, the sky being very clear, Kepler first saw this comet upon the bridge at Prague; and though it had no tail when he first discovered it, yet afterwards it had one of a considerable length and splendour. It was likewise observed by Longomontanus, September 18. He says it appeared as large as Jupiter, though with a very obscure and pale light; that the tail was pretty long and more dense than the tails of comets usually are, but as pale in co-

lour as the comet itself.

‘ In the preceding revolution of 1531, we find our comet observed by the astronomer Appian at Ingoldstadt, the same who first remarked that the tails of comets were always in an opposite direction to the sun; which to him was an evident proof that the sun was the cause of such eruptions.

‘ In 1456, there was a very remarkable exhibition of the same comet. *Cometa inaudita magnitudinis toto mense Junii cum praelonga cauda, ita ut duo fere signa cœli comprehenderit.* (*Theatrum Comet.*)

‘ It is difficult to comprehend how the comet, whose tail was so inconsiderable in its last appearance, should in this have one of sixty degrees: but M. de la Lande, in his Theory of Comets, p. 127. accounts for this difference in the following manner. “ I find, says this active astronomer, that if the comet reached its perihelion in the beginning of June, it ought to have appeared at night towards the middle of the month with 60 degrees of elongation and a very northern latitude, its distance from the earth being less than the semidiameter of the sun: so that in this position, which of all others is the most favourable, it must have appeared in all the splendour allowed to it by the old chronicles. Perhaps by *duo signa* they only mean the extent of two constellations, which is often much less than two signs of the ecliptic.”

‘ In 1379 and 1380 we find two comets mentioned by Alstedius and Lubienietzki, but without any particulars as to the time or form of their appearance.

‘ In 1305, our comet again appears, according to the historians of that time, in all its terrors. *Cometa horrendæ magnitudinis visus, est circa feriâ paschatis, quem secuta est pestilentia maxima.* It is very likely that the horror occasioned by the plague had augmented the terrible impression left by the comet; however, upon calculation, it does appear that the comet must this year have passed very near the earth.

‘ The history of this comet might be traced much higher by consulting Eckstörmius, Riccioli, Alstedius, and Lubienietzki. Among the 415 comets mentioned by this last writer, we find one for the year 1230, which appears to be the very comet in question; another 1005, three periods before; it is found in 930, and higher up in the year 550, marked by the taking of Rome by Totila. All the historians of the empire speak of a great comet in the year 399, which may have been the same. *Cometa fuit prodigiosæ magnitudinis, horribilis aspectu, comam ad terram usque demittere visus.*

‘ In 323, that is to say, 76 years before, a comet also appeared in Virgo; and in short it would be easy to mount, without quitting the same periods, as high as 130 years before Christ, when, according to Justin, one appeared at the birth of Mithridates. But, in these early periods, there would be great danger of meeting with some of those fabulous comets with which it was thought necessary perhaps to embellish every famous reign.”

As this comet engaged the attention of the most celebrated astronomers more than any other, and as its course was calculated by Newton, Halley, Maupertuis, Clairault, De Lisle, Le Monnier, La Caille, Messier, La Lande, Pingre, &c. who unanimously determined that it ought to appear in 1758, it is not to be wondered

dered that those who respected these illustrious names, should expect its return in that year, with absolute certainty, and even with no small degree of fear, as Dr Halley himself had thought that these bodies might possibly strike upon the earth in some of their revolutions, and occasion its utter destruction, or come so near as at least to occasion terrible calamities to those parts which were most exposed to their malignant influences. A mortal fear accordingly seized the minds of great numbers; and this panic seems to have been kept up by some astronomers of inferior note probably with views not entirely disinterested. Of this the following sentence in a book entitled *The Theory of Comets illustrated*, &c. by B. Martin, 1757, is a remarkable instance. "It is well known to astronomers how near that dreadful comet of 1680 approached to the earth's orbit. Also the comets of 1472, 1618, 1684, and the comet which we now expect, with many others, pass so near the orbit of the earth, that it will not be without reason if our fears and apprehensions are considerably raised thereat. However, the reader need not be under any needless terror about the return of this comet: for if it appears before the beginning of next May, it can do no harm; as he may be easily convinced by the view of the comet's orbit which I published some time ago."

52
Disappointment of astronomers in 1758.

The fatal period at length arrived; but no comet appeared. This was a prodigious disappointment to astronomers; and as they were now in danger of being turned into ridicule, it became absolutely necessary to find out some reasons for the retardation of this comet which had been so certainly expected. These were happily found out by Mr Clairault; who accounted for its nonappearance, from retardations occasioned by the attraction of Jupiter and Saturn, which two planets are found to have an effect upon each other's motions, and must have the same upon any other body that comes near them, as shall be more fully explained in the next section. He found, "that the action of Jupiter upon the comet, during the whole revolution of 1531 to 1607, had occasioned a diminution of 19 days in its period, which would not have happened by the mere force of the sun; and at the same time had altered its elements so as to produce an acceleration of near 31 days in the following period.

53
Why the comet did not then appear.

"Proceeding afterwards to the revolution from 1607 to 1682, the action of Jupiter turns out much more considerable: for it occasions an acceleration of about 420 days, which added to the 31 resulting from the action of the same planet during the preceding period, amounts in all to 451 days of diminution in the time of its period; which would not have happened merely by its inclination to the sun.

"Now if we take the difference of these two accelerations, in order to know how much shorter the second period was than the first, it appears to be 432 days; which differs only 37 days from the time resulting from the observations.

"And this period appears to be still diminished by the action of Saturn. Indeed this diminution is not much, because the effects of Saturn's force are almost reciprocally destroyed in the two first periods.

"Hence we see that the theory gives within a month the difference so remarkable between the two known revolutions of this comet. Now if we consider the length

of these periods, the complication of the two causes of their irregularity, and the nature of the problem by which they are measured; this new demonstration of the Newtonian system will perhaps be found as striking as any one that has hitherto been given.

"By comparing, in like manner, the force of the action of Jupiter, during the second period of the comet, with that which will be terminated at its approaching return; I find the revolution about which we are at present interested will be 518 days longer than the preceding, occasioned by the action of Jupiter upon the comet, from its last mean distance to its perihelion; that is, for the last seven or eight years; an interval, during which there can hardly be more than 15 days alteration.

"As to Saturn, the result of its action on the comet is much more considerable compared with the two first revolutions; for I find the present period protracted more than 100 days by it, independent likewise of its action since 1751, and another small object which I have not had time to determine. From these considerations, then, it appears to me, that the expected comet ought to arrive at its perihelion about the middle of the month of April next ensuing."

This period of M. Clairault was found to be somewhat too long; for on the 21st of January 1759, a comet made its appearance, and was seen at different times, to the third of June the same year. The following is Mr Messier's description of it, as viewed April 1st. "When I saw this comet again on the first of April, I could very plainly discern its tail; but could not ascertain its length, because of the morning twilight, which was then beginning, and soon increased much: it filled the field of the telescope; and must have extended far beyond: according to what I have observed, the tail of the comet must have spread to more than 25 degrees: the nucleus was considerable, but not well terminated, and it apparently exceeded the size of stars of the first magnitude; it was of a pale whitish colour, not unlike that of Venus. The nebulousity which surrounded the nucleus, and went on lessening, shewed reddish colours; and these colours grew more vivid towards the brightest part of the tail. The morning twilight, which increased apace, soon put an end to these appearances, and afterwards made the comet itself disappear: however, I had been able to perceive it with the naked eye, when it was somewhat disengaged from the vapours of the horizon." On the first of May it appeared to the naked eye larger than stars of the first magnitude, the nucleus being surrounded with a great coma. Its light was but faint, like that of the planets seen thro' the thick vapours of the horizon. It would have appeared brighter but for the light of the moon. In this last appearance the comet was in the sextant, or 60° from the sun, and was observed by most of the astronomers of Europe.

54
Appears in January 1759.

The triumph of the astronomers seemed now to be complete; and accordingly Dr Bevis exultingly says, Phil. Trans. Vol. LI. "I think I may now venture to pronounce this to be the same as the comet of 1682; and am about making out its future track. If I presume rightly, it will in a short time become in a manner stationary, but diminish very fast both in size and light, the earth and it receding from one another almost in a direct line. It is at this time about four times nearer

55 nearer than the sun is.⁵⁹ Thus we have given the strength of the evidence for the return of comets; and the appearance of that in 1759 is commonly urged as an undeniable proof of their revolution round the sun, and consequently being a kind of planets: but, however strong this evidence may be reckoned, a regard for truth obliges us to take notice, that M. Clairault could not be mistaken, whether he had concluded the comet to have been accelerated or retarded by the action of Jupiter and Saturn; for a comet appeared in the year 1757, in the months of September and October. Had he determined the retardation of the comet to be twice as great as he actually did, still he would have been right by the event, for another comet appeared in 1760. It must be owned that these are perplexing circumstances. It is very singular, that out of four years, in which three comets appeared, the only one in which no comet was to be seen should be that very year in which the greatest astronomers that ever existed had foretold the appearance of one. How far this consideration renders the real accomplishment of Dr Halley's prediction uncertain, we submit to the judgment of the impartial: but, as it is certain that small comets are very frequently to be seen; so, till some better marks for distinguishing one from another than any yet known are found out, perhaps this part of astronomy may not appear to be sufficiently established. Another comet is expected in the year 1789, when some further evidence either one way or another may be hoped for.

56
Newton's computation of the heat of comets, and conjectures concerning them.

The revolution of comets round the sun, and their permanent existence as planets, being granted, we are naturally led to inquire what kind of substances they are, and for what use designed. Sir Isaac Newton, considering the near approach of that of 1680 to the sun, has computed the heat they sometimes undergo to be inconceivably great. That one, in particular, he thought to be heated to a degree 2000 times greater than red-hot iron. In consequence of this calculation he naturally imagined that they were bodies of extreme solidity, in order to sustain such an intensity of heat; and that, notwithstanding their running out into the vast regions of space, where they were exposed to the most intense degrees of cold, they would hardly be cool on their returning again to the sun. Indeed, according to his calculation, the comet of 1680 must be for ever in a violent state of ignition. He hath computed that a globe of red-hot iron of the same dimensions with the earth would scarce be cool in 50,000 years. If then the comet be supposed to cool 100 times faster than red-hot iron, as its heat was 2000 times greater, it must require upwards of a million of years to cool it. In the short period of 575 years, therefore, its heat would be in a manner scarce diminished; and therefore, in its next and every succeeding revolution it must acquire an increase of heat; so that, since the creation, having received a proportional addition in every succeeding revolution, it must now be in a state of ignition very little inferior to that of the sun himself. Sir Isaac hath farther concluded, that this comet must be considerably retarded in every revolution by the atmosphere of the sun within which it enters; and thus must continually come nearer and nearer his body, till at last it falls into it. This, he thinks, may be one use of the comets: viz. to furnish fuel for the sun, which

would otherwise be in danger of wasting, from the continual emission of its light.

As to the tails with which comets are almost constantly attended, Sir Isaac Newton shews, that the atmospheres of comets will furnish vapour sufficient to form their tails. This he argues from that wonderful rarefaction observed in our air, at a distance from the earth: a cubic inch of common air, at the distance of half the earth's diameter, or 4000 miles, would expand itself so as to fill a space larger than the whole region of the stars. Since then the coma or atmosphere of a comet is ten times higher than the surface of the nucleus, counting from the centre thereof; the tail, ascending much higher, must needs be immensely rare: so that it is no wonder the stars should be visible through it.

57
His account of the formation of their tails.

Now, the ascent of vapours into the tail of the comet, he supposes to be occasioned by the rarefaction of the matter of the atmosphere at the time of the perihelion. Sinoke, it is observed, ascends a chimney by the impulse of the air wherein it floats; and air, rarefied by heat, ascends by the diminution of its specific gravity, taking up the smoke along with it: why then should not the tail of a comet be supposed to be raised after the same manner by the sun? for the sun-beams do not act on the mediums they pass through, any otherwise than by reflection and refraction.

The reflecting particles, then, being warmed by the action, will again warm the ether wherewith they are compounded; and this, rarefied by the heat, will have its specific gravity, whereby it before tended to descend, diminished by the rarefaction, so as to ascend, and to carry along with it those reflecting particles whereof the tail of the comet is composed.

This ascent of the vapours will be promoted by their circular motion round the sun; by means whereof they will endeavour to recede from the sun, while the sun's atmosphere, and the other matters in the celestial spaces, are either at rest, or nearly so, as having no motion but what they receive from the sun's circumrotation.

Thus are the vapours raised into the tails of comets in the neighbourhood of the sun, where the orbits are most curve; and where the comets, being within the denser atmosphere of the sun, have their tails of the greatest length.

The tails thus produced, by preserving that motion, and at the same time gravitating towards the sun, will move round his body in ellipses, in like manner as their heads; and by this means will ever accompany and freely adhere to their head. In effect, the gravitation of the vapours towards the sun will no more occasion the tails of comets to forsake their heads, and fall down towards the sun, than the gravitation of their heads will occasion them to fall off from their tails; but, by their common gravitation, they will either fall down together to the sun, or be together suspended or retarded. This gravitation, therefore, does not at all hinder, but that the heads and tails of comets may receive and retain any position towards each other, which either the abovementioned causes, or any other, may occasion.

The tails therefore, thus produced in the perihelion of comets, will go off along with their head into remote regions; and either return thence, together with the comets, after a long series of years; or rather be there lost, and vanish by little and little, and the comet

be left bare; till, at its return, descending towards the sun, some little short tails be gradually and slowly produced from the heads; which afterwards, in the perihelion, descending down into the sun's atmosphere, will be immensely increased.

The vapours thus dilated, rarefied, and diffused thro' all the celestial regions, the same author observes, may probably, by little and little, by means of their own gravity, be attracted down to the planets, and become intermingled with their atmospheres.

He adds, that for the conservation of the water and moisture of the planets, comets seem absolutely requisite; from whose condensed vapours and exhalations all that moisture which is spent in vegetations and putrefactions, and turned into dry earth, &c. may be resupplied and recruited. For all vegetables grow and increase wholly from fluids; and, again, as to their greatest part, turn by putrefaction into earth, an earthy slime being perpetually precipitated to the bottom of putrefying liquors. Hence, the quantity of dry earth must continually increase, and the moisture of the globe decrease, and at last be quite evaporated; if it have not a continual supply from some part or other of the universe. And I suspect, adds our great author, that the spirit, which makes the finest, subtlest, and best part of our air, and which is absolutely requisite for the life and being of all things, comes principally from the comets.

On this principle, there seems to be some foundation for the popular opinion of preludes from comets: since the tail of a comet, thus intermingled with our atmosphere, may produce changes very sensible in animal and vegetable bodies.

58
Controverted
by Dr
Hamilton.

This account of the formation of the tails of comets, we find controverted by Dr Hamilton of Dublin, in a small treatise intitled *Conjectures on the nature of the Aurora Borealis, and on the tails of Comets*. His hypothesis is, that the comets are of use to bring back the electric fluid to the planets, which is continually discharged from the higher regions of their atmospheres. Having given at length the abovementioned opinion of Sir Isaac, "We find (says he) in this account, that Sir Isaac ascribes the ascent of comets tails to their being rarer and lighter, and moving round the sun more swiftly, than the solar atmosphere, with which he supposes them to be surrounded whilst in the neighbourhood of the sun; he says also, that whatever position (in respect to each other) the head and tail of a comet then receive, they will keep the same afterwards most freely; and in another place he observes, 'That the celestial spaces must be entirely void of any power of resisting, since not only the solid bodies of the planets and comets, but even the exceeding thin vapours of which comets tails are formed, move thro' those spaces with immense velocity, and yet with the greatest freedom.' I cannot help thinking that this account is liable to many difficulties and objections, and that it seems not very consistent with itself or with the phenomena.

"I do not know that we have any proof of the existence of a solar atmosphere of any considerable extent, nor are we any where taught how to guess at the limits of it. It is evident that the existence of such an atmosphere cannot be proved merely by the ascent of comets tails from the sun, as that phenomenon may

possibly arise from some other cause. However, let us suppose, for the present, that the ascent of comets tails is owing to an atmosphere surrounding the sun, and see how the effects arising from thence will agree with the phenomena. When a comet comes into the solar atmosphere, and is then descending almost directly to the sun, if the vapours which compose the tail are raised up from it by the superior density and weight of that atmosphere, they must rise into those parts that the comet has left, and therefore at that time they may appear in a direction opposite to the sun. But as soon as the comet comes near the sun, and moves in a direction nearly at right angles with the direction of its tail, the vapours which then arise, partaking of the great velocity of the comet, and being specifically lighter than the medium in which they move, and being vastly expanded through it, must necessarily suffer a resistance immensely greater than what the small and dense body of the comet meets with, and consequently cannot possibly keep up with it, but must be left behind, or, as it were, driven backwards by the resistance of that medium into a line directed towards the parts which the comet has left, and therefore can no longer appear in a direction opposite to the sun. And, in like manner, when a comet passes its perihelion, and begins to ascend from the sun, it certainly ought to appear ever after with its tail behind it, or in a direction pointed towards the sun; for if the tail of the comet be specifically lighter than the medium in which it moves with so great velocity, it must be just as impossible it should move foremost, as it is that a torch moved swiftly thro' the air should project its flame and smoke before it. Since therefore we find that the tail of a comet, even when it is ascending from the sun, moves foremost, and appears in a direction nearly opposite to the sun, I think we must conclude that the comet and its tail do not move in a medium heavier and denser than the matter of which the tail consists, and consequently that the constant ascent of the tail from the sun must be owing to some other cause. For that the solar atmosphere should have density and weight sufficient to raise up the vapours of a comet from the sun, and yet not be able to give any sensible resistance to these vapours in their rapid progress through it, are two things inconsistent with each other. And therefore, since the tail of a comet is found to move as freely as the body does, we ought rather to conclude that the celestial spaces are void of all resisting matter, than that they are filled with a solar atmosphere, be it ever so rare.

"But there is, I think, a further consideration which will shew, that the received opinion, as to the ascent of comets tails, is not agreeable to the phenomena, and may at the same time lead us to some knowledge of the matter of which these tails consist: which I suspect is of a very different nature from what it has been hitherto supposed to be. Sir Isaac says, the vapours, of which the tail of a comet consists, grow hot by reflecting the rays of the sun, and thereby warm and rarefy the medium which surrounds them; which must therefore ascend from the sun, and carry with it the reflecting particles of which the tail is formed; for he always speaks of the tail as shining by reflected light. But one would rather imagine, from the phenomena, that the matter which forms a comet's tail has not the least sensible power of reflecting the rays of light.

light. For it appears from Sir Isaac's observation, which I have quoted already, that the light of the smallest stars, coming to us through the immense thickness of a comet's tail, does not suffer the least diminution. And yet, if the tail can reflect the light of the sun so copiously, as it must do if its great splendour be owing to such reflection, it must undoubtedly have the same effect on the light of the stars; that is, it must reflect back the light which comes from the stars behind it, and by so doing must intercept them from our sight, considering its vast thickness, and how exceedingly slender a ray is that comes from a small star; or if it did not intercept their whole light, it must at least increase their twinkling. But we do not find that it has even this small effect, for those stars that appear through the tail are not observed to twinkle more than others in their neighbourhood. Since therefore this fact is supported by observations, what can be a plainer proof that the matter of a comet's tail has no power of reflecting the rays of light? and consequently that it must be a self-shining substance. But the same thing will further appear, from considering that bodies reflect and refract light by one and the same power; and therefore if comets tails want the power of refracting the rays of light, they must also want the power of reflecting them. Now, that they want this refracting power appears from hence: If that great column of transparent matter which forms a comet's tail, and moves either in a vacuum, or in some medium of a different density from its own, had any power of refracting a ray of light coming through it from a star to us, that ray must be turned far out of its way in passing over the great distance between the comet and the earth; and, therefore, we should very sensibly perceive the smallest refraction that the light of the stars might suffer in passing through a comet's tail. The consequence of such a refraction must be very remarkable: the stars that lie near the tail would, in some cases, appear double; for they would appear in their proper places by their direct rays, and we should see their images behind the tail, by means of their rays which it might refract to our eyes; and those stars that were really behind the tail would disappear in some situations, their rays being turned aside from us by refraction. In short, it is easy to imagine what strange alterations would be made in the apparent places of the fixed stars by the tails of comets, if they had a power of refracting their light, which could not fail to be taken notice of, if any such ever happened. But since astronomers have not mentioned any such apparent changes of place among the stars, I take it for granted that the stars seen through all parts of a comet's tail appear in their proper places, and with their usual colours, and consequently I infer that the rays of light suffer no refraction in passing through a comet's tail. And thence I conclude (as before) that the matter of a comet's tail has not the power of refracting or reflecting the rays of light, and must therefore be a lucid or self-shining substance."

But, whatever probability the Doctor's conjecture concerning the materials whereof the tails are formed may have in it, his criticism on Sir Isaac Newton's account of them seems not to be just: for that great philosopher supposes the comets to have an atmosphere peculiar to themselves; and consequently, in their nearest

approaches to the sun, both comet and atmosphere are immersed in the atmosphere of that luminary. In this case, the atmosphere of the comet being prodigiously heated on the side next to the sun, and consequently the equilibrium in it broken, the denser parts will continually pour in from the regions farthest from the sun; for the same reason, the more rarefied part which is before, will continually fly off opposite to the sun, being displaced by that which comes from behind; for tho' we must suppose the comet and its atmosphere to be heated on all sides to an extreme degree, yet still that part which is farthest from the sun will be less hot, and consequently more dense, than what is nearest to his body. The consequence of this is, that there must be a constant stream of dense atmosphere descending towards the sun, and another stream of rarefied vapours and atmosphere ascending on the contrary side; just as, in a common fire, there is a constant stream of dense air descending, which pushes up another of rarefied air, flame, and smoke. The resistance of the solar atmosphere may indeed be very well supposed to occasion the curvature observable in the tails of comets, and their being better defined in the fore part than behind; and this appearance we think Dr Hamilton's hypothesis is incapable of solving. We grant, that there is the utmost probability that the tails of comets are streams of electric matter; but they who advance a theory of any kind ought to solve every phenomenon, otherwise their theory is insufficient. It was incumbent on Dr Hamilton, therefore, to have explained how this stream of electric matter comes to be bent into a curve, and also why it is better defined and brighter on the outer side of the arch than on the inner. This indeed he attempts, in the following manner: "But that this curvature was not owing to any resisting matter appears from hence, that the tail must be bent into a curve though it met with no resistance; for it could not be a right line, unless all its particles were projected in parallel directions, and with the same velocity, and unless the comet moved uniformly in a right line. But the comet moves in a curve, and each part of the tail is projected in a direction opposite to the sun, and at the same time partakes of the motion of the comet; so that the different parts of the tail must move on in lines which diverge from each other; and a line drawn from the head of a comet to the extremity of the tail will be parallel to a line drawn from the sun to the place where the comet was when that part of the tail began to ascend, as Sir Isaac observes; and so all the chords, or lines drawn from the head of the comet to the intermediate parts of the tail, will be respectively parallel to lines drawn from the sun to the places where the comet was when these parts of the tail began to ascend. And therefore, since these chords of the tail will be of different lengths, and parallel to different lines, they must make different angles, with a great circle passing through the sun and comet, and consequently a line passing through their extremities will be a curve.

"It is observed, that the convex side of the tail which is turned from the sun is better defined, and shines a little brighter, than the concave side. Sir Isaac accounts for this, by saying, that the vapour on the convex side is fresher (that is, has ascended later) than that on the concave side; and yet I cannot see how the particles on

Dr Hamilton's hypothesis insufficient.

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Sir Isaac's account defended.

the convex side can be thought to have ascended rather than those on the concave side which may be nearer to the head of the comet. I think it rather looks as if the tail, in its rapid motion, met with some slight resistance just sufficient to cause a small condensation in that side of it which moves foremost, and which would occasion it to appear a little brighter and better defined than the other side; which slight resistance may arise from that subtle ether which is supposed to be diffused through the celestial regions, or from this very electric matter dispersed in the same manner, if it be different from the ether.⁶¹

On the last part of this observation we must remark, that though a slight resistance in the ethereal medium would have served Sir Isaac Newton's turn, it will by no means serve Dr Hamilton's; for though a stream of water or air may be easily destroyed or broken by resistance, yet a stream of electric matter seems to set every obstacle at defiance. If a sharp needle is placed on the conductor of an electric machine, and the machine set in motion, we will perceive a small stream of electric matter issuing from the point; but though we blow against this stream of fire with the utmost violence, it is impossible either to move it, or to brighten it on the side against which we blow. If the celestial spaces then are full of a subtle ether capable of thus affecting a stream of electric matter, we may be sure that it also will resist very violently; and we are then as much diffculted to account for the projectile motion continuing amidst such violent resistance; for if the ether resists the tail of the comet, it is impossible to prove that it doth not resist the head also.

⁶¹ Electric matter not always passive.

This objection may appear to some to be but weakly founded, as we perceive the electric fluid to be endowed with such extreme subtilty, and to yield to the impression of solid bodies with such facility, that we easily imagine it to be of a very passive nature in all cases. But we are inclined to think, that this fluid only shews itself passive where it passes from one body into another, which it seems very much inclined to do of itself. We are also much mistaken, if it will not be found, on proper examination of all the phenomena, that the only way we can manage the electric fluid at all is by allowing it to direct its own motions. In all cases where we ourselves attempt to assume the government of it, it shews itself the most untractable and stubborn being in nature. But these things come more properly under the article *ELECTRICITY*, where they are fully considered. Here, it is sufficient to observe, that a stream of electric matter resists air, and from the phenomena of electric repulsion we are sure that one stream of electric matter resists another; from which we may be also certain, that if a stream of electric matter moves in an aerial fluid, such fluid will resist it, and we can only judge of the degree of resistance it meets with in the heavens from what we observe on earth. Here we see the most violent blast of air has no effect upon a stream of electric fluid; in the celestial regions, either air, or some other fluid, has an effect upon it according to Dr Hamilton. The resistance of that fluid, therefore, must be greater than that of the most violent blast of air we can imagine.

As to the Doctor's method of accounting for the curvature of the comet's tail, it might do very well on Sir Isaac Newton's principles, but cannot do so on his.

There is no comparison between the celerity with which rarefied vapour ascends in our atmosphere, and that whereby the electric fluid is discharged. The velocity of the latter seems to equal that of light; of consequence, supposing the velocity of the comet to be equal to that of the earth in its annual course, and its tail equal in length to the distance of the sun from the earth, the curvature of the tail could only be to a straight line, as the velocity of the comet in its orbit is to the velocity of light, which, according to the calculations of Dr Bradley, is as 10,201 to 1.—The apparent curvature of such a comet's tail, therefore, would at this rate only be $\frac{1}{10201}$ part of its visible length, and thus behaved always to be imperceptible. The velocity of comets is indeed sometimes inconceivably great. Mr Brydone observed one at Palermo, in July 1770, which in 24 hours described an arch in the heavens upwards of 50 degrees in length; according to which he supposes, that, if it was as far distant as the sun, it must have moved at the rate of upwards of 60 millions of miles in a day. But this comet was attended with no tail, so that we cannot be certain whether the curvature of the tails of these bodies corresponds with their velocity or not.

⁶² Prodigious velocity of a comet observed by Mr Brydone.

On this occasion Mr Brydone observes, that the comets without tails seem to be of a very different species from those which have tails: to the latter, he says, they appear to bear a much less resemblance than they do even to planets. He tells us that comets with tails have seldom been visible but on their recedes from the sun; that they are kindled up, and receive their alarming appearance, in their near approach to this glorious luminary; but that those without tails are seldom or never seen but on their way to the sun, and he does not recollect any whose return has been tolerably well ascertained. "I remember indeed (says he), a few years ago, a small one, that was said to have been discovered by a telescope after it had passed the sun, but never more became visible to the naked eye. This assertion is easily made, and nobody can contradict it; but it does not at all appear probable that it should have been so much less luminous after it had passed the sun, than before it approached him: and I will own to you, when I have heard that the return of these comets had escaped the eyes of the most acute astronomers, I have been tempted to think that they did not return at all, but were absorbed in the body of the sun, which their violent motion towards him seemed to indicate." He then attempts to account for the continual emission of the sun's light without waste, by supposing that there are numberless bodies throughout the universe that are attracted into the body of the sun, which serve to supply the waste of light, and which for some time remain obscure, and occasion spots on his surface, till at last they are perfectly dissolved and become bright like the rest. This hypothesis will account for the dark spots becoming as bright, or even brighter than the rest of the disk, but will by no means account for the brighter spots becoming dark. Of this comet too, Mr Brydone remarks, that it was evidently surrounded by an atmosphere which refracted the light of the fixed stars, and even seemed to cause them change their places as the comet came near them.

⁶³ His conjectures concerning comets without tails.

A very strange opinion we find set forth in a book Mr Cole's entitled hypothesis.

⁶⁴

entitled "Observations and Conjectures on the nature and properties of light, and on the theory of comets, by William Cole." This gentleman supposes that the comets belong to no particular system; but were originally projected in such directions as would successively expose them to the attraction of different centres, and thus they would describe various curves of the parabolic and the hyperbolic kind. This treatise is written in answer to some objections thrown out in Mr Brydson's tour, against the motions of the comets by means of the two forces of gravitation and projection, which were thought sufficient for that purpose by Sir Isaac Newton; of which we shall treat as fully as our limits will allow, in the next section.

⁶⁵
Fixed stars
supposed to
be suns.

With regard to the fixed stars, they are generally supposed to be of the same nature with our sun, each of them attended by planets as he is; and these planets, as well as those which attend our sun, are supposed like this earth to be inhabited by rational creatures.—The strongest argument for the fixed stars being suns is taken from the impossibility of magnifying their diameters by the best telescopes, which is thought to arise from the vast distance at which they are placed from the earth. As it is impossible that they can be seen by any reflection of light from the sun at such immense distances, we must therefore necessarily suppose them endowed with a power of emitting light from their own bodies; and by comparing the apparent diameters of objects at different distances, it is conjectured that our sun would appear but like a star, was he to be removed to the distance at which they are placed. Of consequence, the fixed stars are supposed to be equal if not superior in magnitude to that which is the centre of our system; and as it would be absurd to suppose the wife Author of nature to have made so many suns without any thing to shine upon, it is thence concluded that they are attended by planets, which receive the same benefit from them that the earth does from our sun. In like manner, it would be absurd to suppose so many habitable worlds enlightened by suns without having any inhabitants; and therefore it is concluded, that all the planets of every system are inhabited: to corroborate which hypothesis the infinite benevolence of the Deity is urged, who would not, it is thought, suffer any part of the visible creation to want living creatures that might be spectators of his goodness. It is also asserted, that even the planets belonging to our own system are but of a very trifling use to this earth, their whole combined light being much less than that of the moon alone. Much less can we suppose the fixed stars to be made for the use of this earth: for many of them are utterly invisible without the assistance of telescopes; and when they are thus seen, only appear as so many shining points; and it would be absurd to the highest degree to think that they were created merely to be seen by astronomers.

The fixed stars are not supposed to be at equal distances from us, but to be more remote in proportion to their apparent smallness. This supposition is necessary to prevent any interference of their planets; and thus there may be as great a distance between a star of the first magnitude and one of the second apparently close to it, as between the earth and the fixed stars first mentioned.

Those who take the contrary side of the question,

affirm that the disappearance of some of the fixed stars is a demonstration that they cannot be suns, as it would be to the highest degree absurd to think that God would create a sun which might disappear of a sudden and leave its planets and their inhabitants in endless night. Yet this opinion, we find adopted by Dr Keil, who tells us, "It is no ways improbable that these stars lost their brightness by a prodigious number of spots which entirely covered and overwhelmed them. &c. In what dismal condition must their planets remain, who have nothing but the dim and twinkling light of the fixed stars to enlighten them?" Others, however, have made suppositions more favourable to the benevolent character of the Deity. Sir Isaac Newton thinks that the sudden blaze of some stars may have been occasioned by the falling of a comet into them, by which means they would be enabled to emit a prodigious light for a little time, after which they would gradually return to their former state. Others have thought that the variable ones, which disappear for a time, were planets, which were only visible during some part of their course: but this their apparent immobility, notwithstanding their decrease of lustre, will not allow us to think. Some have imagined, that one side of them might be naturally much darker than the other, and when by the revolution of the star upon its axis the dark side was turned towards us, the star became invisible, and, for the same reason, after some interval, resumed its former lustre. Lastly, Mr Dunn, (Phil. Trans. Vol. LII.) in a dissertation concerning the apparent increase of magnitude in the heavenly bodies when they approach the horizon, conjectures that the interposition of some gross atmosphere may solve the phenomena both of nebulous and new stars. "The phenomena of nebulous and new stars (says he) have engaged the attention of curious astronomers; but none that I know of have given any reason for the appearance of nebulous stars. Possibly what has been before advanced may also be applicable for investigating reasons for those strange appearances in the remotest parts of the universe.

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Opposed,
from the va-
riable na-
ture of the
stars.

⁶⁸
Conjectures
concerning
new stars,
&c.

⁶⁹
Mr Dunn's
hypothesis.

"From many instances which might be produced concerning the nature and properties of lights and illuminations on the earth's surface, concerning the nature and properties of the earth's atmosphere, and concerning the atmospheres and illuminations of comets, we may safely conclude, that the atmospheres of comets and of our earth are more gross in their nature than the ethereal medium which is generally diffused through the solar system. Possibly a more aqueous vapour in the one than the other makes the difference. Now, as the atmospheres of comets and of planets in our solar system are more gross than the ether which is generally diffused through our solar system, why may not the ethereal medium diffused throughout those other solar systems (whose centres are their respective fixed stars) be more gross than the ethereal medium diffused throughout our solar system? This indeed is an hypothesis, but such an one as agrees exactly with nature. For these nebulous stars appear so much like comets, both to the naked eye and through telescopes, that the one cannot always, by any difference of their extraneous light, be known from the other.

"Such orbs of gross ether reflecting light more copiously, or like the atmospheres of comets, may help

⁶⁶
Arguments
for the plu-
rality of
worlds.

us to judge of the magnitudes of the orbs illuminated by those remote suns, when all other means seem to fail.

“The appearance of new stars, and disappearance of others, possibly may be occasioned by the interposition of such an ethereal medium, within their respective orbs, as either admits light to pass freely, or wholly absorbs it at certain times, whilst light is constantly pursuing its journey through the vast regions of space.”

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Fixed stars
supposed to
by some to
be polished
globes.

The other arguments for the plurality of worlds, the opposers of this doctrine attempt to evade, by telling us that the not being able to magnify the fixed stars with telescopes is not a sufficient proof of their immense distance. We know, say they, that light may be reflected so as that no telescope whatever could magnify the object from which it is reflected; and this without supposing it at any great distance. Thus, the light of the sun reflected from a polished globe of metal, or of glass quick-silvered, shews an image of him like a small star, and which would be visible at a great distance, without a possibility of being magnified. If we then suppose the fixed stars to be polished globes reflecting the sun's light, we may account for the impossibility of magnifying them without ascribing to them such an extravagant distance. A hypothesis something similar to this was published a few years ago at London. A formidable objection against it seems to be the apparent immobility of the stars with regard to one another, notwithstanding the continual motion of the earth, which one would naturally imagine behoved to cause a considerable variation of the apparent places of the fixed stars at different times of the year.

SECT. IV. Of the different Systems by which the Celestial Phenomena have been accounted for.

In treating of the various systems which have been invented in different ages, we do not mean to give an account of all, or even the greatest part, of the absurdities that have been broached by individuals on this subject; but shall confine ourselves to those systems which have been of considerable note, and been generally followed for a number of years. Concerning the opinions of the very first astronomers about the system of nature, we are necessarily as ignorant as we are of those astronomers themselves. Whatever opinions are handed down to us, must be of a vastly later date than the introduction of astronomy among mankind. If we may hazard a conjecture, however, we are inclined to think that the first opinions on this subject were much more just than those that were held afterwards for many ages.

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Pythagorean system.

We are told that Pythagoras maintained the motion of the earth, which is now universally believed, but at that time appears to have been the opinion of only a few detached individuals of Greece. As the Greeks borrowed many things from the Egyptians, and Pythagoras had travelled into Egypt and Phenice, it is probable he might receive an account of this hypothesis from thence: but whether he did so or not, we have now no means of knowing, neither is it of any importance whether he did or not. Certain it is, however, that this opinion did not prevail in his days, nor for many ages after. In the 2^d century after Christ, the very name of the Pythagorean hypothesis was suppressed by a system erected by the famous geographer

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Suppressed by the Ptolemaic.

and astronomer Claudius Ptolemæus. This system, which commonly goes by the name of the *Ptolemaic*, he seems not to have originally invented, but adopted as the prevailing one of that age; and perhaps made it somewhat more consistent than it was before. He supposed the earth at rest in the centre of the universe. Round the earth, and the nearest to it of all the heavenly bodies, the moon performed its monthly revolutions. Next to the moon, was placed the planet Mercury; then Venus; and above that the Sun, Mars, Jupiter, and Saturn, in their proper orbits; then the sphere of the fixed stars; above these, two spheres of what he called *crystalline* heavens; above these was the primum mobile, which by turning round once in 24 hours, by some unaccountable means or other, carried all the rest along with it. This primum mobile was encompassed by the empyrean heaven, which was of a cubic form, and the seat of angels and blessed spirits. Besides the motions of all the heavens round the earth once in 24 hours, each planet was supposed to have a particular motion of its own; the moon, for instance, once in a month, performed an additional revolution, the sun in a year, &c.

It is easy to see, that, on this supposition, the confused motions of the planets already described, could never be accounted for. Had they circulated uniformly round the earth, their apparent motion ought always to have been equal and uniform, without appearing either stationary, or retrograde, in any part of their courses. In consequence of this objection, Ptolemy was obliged to invent a great number of circles interfering with each other, which he called *epicycles* and *excentrics*. These proved a ready and effectual salvo for all the defects of his system; as whenever a planet was deviating from the course it ought, on his plan, to have followed, it was then only moving in an epicycle or an excentric, and would in due time fall into its proper path. As to the natural causes by which the planets were directed to move in these epicycles and excentrics, it is no wonder that he found himself much at a loss, and was obliged to have recourse to divine power for an explanation, or, in other words, to own that his system was unintelligible.

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Ptolemy's system insufficient.

This system continued to be in vogue till the beginning of the 16th century, when Nicolaus Copernicus, a native of Thorn (a city of regal Prussia), and a man of great abilities, began to try whether a more satisfactory manner of accounting for the apparent motions of the heavenly bodies could not be obtained than was afforded by the Ptolemaic hypothesis. He had recourse to every author upon the subject, to see whether any had been more consistent in explaining the irregular motions of the stars, than the mathematical schools; but received no satisfaction, till he found, first from Cicero, that Nicetas the Syracusan had maintained the motion of the earth; and next, from Plutarch, that others of the ancients had been of the same opinion. From the small hints he could obtain from the ancients, Copernicus then deduced a most complete system capable of solving every phenomenon in a satisfactory manner. From him this system hath ever afterwards been called the *Copernican*, and represented Plate XLIII. fig. 1. Here the sun is supposed to be in the centre; next him revolves the planet Mercury; then Venus; next, the Earth, with the Moon; beyond these, Mars, Jupiter, and Saturn;

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Pythagorean system revived by Copernicus.

turn; and far beyond the orbit of Saturn, he supposed the fixed stars to be placed, which formed the boundaries of the visible creation.

Though this hypothesis afforded the only natural and satisfactory solution of the phenomena which so much perplexed Ptolemy's system, it met with great opposition at first; which is not to be wondered at, considering the age in which he lived. Even the famous astronomer Tycho Brahe could never assent to the earth's motion, which was the foundation of Copernicus's scheme. He therefore invented another system, whereby he avoided the ascribing of motion to the earth, and at the same time got clear of the difficulties with which Ptolemy was embarrassed. In this system, the earth was supposed the centre of the orbits of the sun and moon; but the sun was supposed to be the centre of the orbits of the five planets; so that the sun with all the planets were by Tycho Brahe supposed to turn round the earth, in order to save the motion of the earth round its axis once in 24 hours. This system was never much followed, the superiority of the Copernican scheme being evident at first sight.

The system of Copernicus coming soon into universal credit, philosophers began to inquire into the causes of the planetary motions; and here, without entering upon what has been advanced by detached individuals, we shall content ourselves with giving an account of the three famous systems, the Cartesian, the Newtonian, and what is sometimes called the *Mechanical* system.

Des Cartes, the founder of that system which since his time has been called the *Cartesian*, flourished about the beginning of the 17th century. His system seems to have been borrowed from the philosophers Democritus and Epicurus; who held, that every thing was formed by a particular motion of very minute bodies called *atoms*, which could not be divided into smaller parts. But tho' the philosophy of Des Cartes resembled that of the Corpuscularians, in accounting for all the phenomena of nature merely from matter and motion; he differed from them in supposing the original parts of matter capable of being broken. To this property his *Materia Subtilis* owes its origin. To each of his atoms, or rather small masses of matter, Des Cartes attributed a motion on its axis, and likewise maintained that there was a general motion of the whole matter of the universe round like a vortex or whirlpool. From this complicated motion, those particles, which were of an angular form, would have their angles broke off; and the fragments which were broke off being smaller than the particles from which they were abraded, behaved to form a matter of a more subtle kind than that made of large particles; and as there was no end of the abrasion, different kinds of matter of all degrees of fineness would be produced. The finest sorts, he thought, would naturally separate themselves from the rest, and be accumulated in particular places. The finest of all would therefore be collected in the sun, which was the centre of the universe, whose vortex was the whole ethereal matter in the creation. As all the planets were immersed in this vortex, they behaved to be carried round by it, in different times, proportioned to their distances; those which were nearest the sun, circulating the most quickly; and those farthest off, more slowly; as those parts of a vortex which are farthest removed from the centre are observed to circulate more slowly

than those which are nearest. Besides this general vortex of the sun, each of the planets had a particular vortex of their own by which their secondary planets were carried round, and any other body that happened to come within reach of it would likewise be carried away.

It is easy to see, from this short account of Des Cartes's system, that the whole of it was a mere *petitio principii*: for had he been required to prove the existence of his materia subtilis, he must undoubtedly have failed in the attempt; and hence, though his hypothesis was for some time followed for want of a better, yet it gave way to the Newtonian almost as soon as the latter was proposed.

When Sir Isaac Newton undertook the reformation of philosophy, he proceeded upon a very different plan from all those who had gone before him, as he proposed to assume nothing as an hypothesis which was not deduced from what is obvious to our eyes; and thus, by arguing from those things which are within our reach, he thought we might come to know with certainty, what must happen in the celestial regions, to which access is denied us. The manner in which he was first led to form his system of gravitation, which hath since been so universally received, is said to have been as follows. He was sitting alone in a garden, when some apples, falling from a tree, led his thoughts upon the subject of gravity; and reflecting on the power of that principle, he began to consider, that, as this power is not found to be sensibly diminished at the remotest distance from the centre of the earth to which we can rise, neither at the tops of the loftiest buildings, nor on the summits of the highest mountains, it appeared to him reasonable to conclude that this power must extend much further than was usually thought.

"Why not as far as the moon? (said he to himself); and if so, her motion must be influenced by it; perhaps she is retained in her orbit thereby: however, though the power of gravity is not sensibly weakened in the little change of distance at which we can place ourselves from the centre of the earth, yet it is very possible, that, as high as the moon, this power may differ much in strength from what it is here." To make an estimate what might be the degree of this diminution, he considered with himself, that if the moon be retained in her orbit by the force of gravity, no doubt the primary planets are detained in their orbits by a similar gravitation towards the sun; and by comparing the periods of the several planets with their distances from the sun, he found, that if any power like gravity held them in their courses, its strength must decrease in the duplicate proportion of the increase of distance. This was concluded from a supposition that these bodies moved in perfect circles round the sun; which though they are not found to do exactly, yet the error was but of little consequence. The fact itself will be understood from the following considerations. Let B Y U (Plate XLIV. fig. 3.) be the orbit of a planet round the sun S. It is manifest from inspection, that during the time in which the planet moves from B to Y, it deviates in a perpendicular direction from the tangent line A B X, by the space X Y, equal to B y which is the versed sine of the arch B Y. Were the planet therefore retained in its orbit by a gravitating power towards the sun, it would require for this purpose a power of

78 Gives way to the Newtonian.

79 Foundation of Sir Isaac's system.

80 His discovery of the law of gravity.

gravitation sufficient to make it fall towards the sun, or, at least, to deviate from a tangent, by the whole length of the versed sine of the arch which it describes in the same time. Thus, suppose the planet is observed to move from B to Y in the space of a minute; we thence know, that, had it been left to the force of gravity alone, it would have fallen from B to y in the same time. In proportion as the radius is lengthened, the length of the arch B Y will become a proportionably smaller part of the circle, and thus approach more nearly to the right line A B X; so that, if we suppose one planet both to take longer time to describe the same space in its orbit, and likewise to deviate less from a straight line in describing that space than another does, it is plain that the force of gravity must be much greater in the latter than in the former. By comparing in this manner the distances of the several planets from the sun, and of the secondary planets from their primaries, Sir Isaac Newton observed the gravitating power towards each body to decrease in a duplicate proportion to the increase of distance from the sun, or from the primary planet, as already mentioned.

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Gravity not proportioned to the bulks of the celestial bodies.

In the course of these observations a very singular circumstance occurred, namely, that the force of gravity was not at all proportioned to the apparent bulk of the planets, or even of the sun himself. In this respect the earth seems to have the advantage over all the other bodies in the system. This is discovered by comparing the bulk of the sun with that of the several planets, and the bulk of the earth with that of the moon, and her distance from the earth. From this comparison it appears, that our moon is vastly larger in proportion than any of those belonging to Jupiter or Saturn, and consequently more difficult to be retained in her orbit: her distance is also much greater than that of the most remote satellites of these planets, as is obvious from their figures.

82
An objection drawn from thence.

This seemed to be a difficulty in Sir Isaac's hypothesis of gravity: for if such a property existed in all bodies, and was proportioned to their quantities of matter, it was naturally asked why it was not in proportion to the bulk of the sun or planets. To obviate this objection, Sir Isaac, observing the effect of fire on our earth to rarefy bodies and make them occupy more space than they did before, naturally enough concluded that the sun was of a more rare substance, or contained less matter in proportion to his bulk than the earth did; and having considered the matter mathematically, he concluded the sun to be four times rarer than the earth.

But though the difficulty was removed with regard to the sun, it still remained as to Jupiter and Saturn; both of these planets being found by observations of the distances and periodical times of their satellites, to be rarer than the earth; whereas, in the opinion of Des Cartes and other philosophers, they were more dense, as being placed at a greater distance from the sun, and in a colder region. Indeed, according to the above-mentioned cause of the sun's rarefaction, these planets ought to have been accounted more dense bodies than this earth; but whatever was the reason, Sir Isaac and all philosophers who followed him have considered them as much rarer. For this supposition, they have not assigned any natural cause; but chosen to refer it to the will of the Deity, and think his wisdom is

manifested in placing the densest planets next the sun, that they may be able to resist his heat, and the rarest at a distance from him, that they may not be too much consolidated by the cold.

As for Des Cartes's method of accounting for the planetary motions, Sir Isaac Newton entirely overturned it, by shewing, that, if they were carried about in a vortex of fluid matter, their periodical times behaved to be directly as the squares of their distances from the sun; whereas from observation it is found, that the squares of the periodical times of the planets are as the cubes of their distances. He also shewed, that no motion could be continued in a fluid medium, because whatever body moved in such a medium behaved to communicate its motion to the fluid. In proportion as motion was communicated to the fluid, it behaved to be lost to the body; which, besides, would be resisted by the fluid itself, and this resistance would be in the proportion of the square of the velocity where-with the body moved: and for these reasons he concluded that the celestial regions were entirely void of matter, excepting perhaps some exceedingly rare exhalations from the planets and comets, and the rays of light, which were considered by him as substances of such extreme tenuity as to give no sensible resistance to any body whatever.

83
Cartes's vortices proved to have no existence.

To account for the perpetual motions of the planets and comets in their orbits, Newton had recourse to the force of gravity already mentioned, and a projectile force compounded with it. These two forces had indeed been proposed by Mr Horrox some time before with the same view, and the power of gravity as existing in the celestial regions had been hinted at by several philosophers; but before Sir Isaac, little notice had been taken of this scheme; owing, no doubt, to the inferiority of those geniuses who had proposed it, to that of our celebrated philosopher. As Sir Isaac was ignorant of any natural power by which the planets could be impelled in the direction of a tangent line to any part of their orbits, he was obliged to have recourse for one of his forces to the immediate action of the Deity himself. According to him, God having created this world, and impressed the universal law of attraction or gravitation upon matter, impelled each of the planets in the direction of a right line touching their orbits. Being immediately acted upon by the attraction of the sun, their courses were bent from a straight line into a circle; and the same causes still continuing to act, the original rectilinear direction was changed into one nearly circular, which has continued ever since. The same reason was given for the continued motion of the secondary planets round their primaries; but as for the motion of the earth, sun, and planets, round their axis, we have not heard that the Newtonian philosophers assign any natural cause.

84
Planetary revolutions accounted for.

Upon this plan Sir Isaac Newton accounted for the motion both of planets and comets; the latter of which had been, and still is, an unsuperable objection to the system of Des Cartes: for, if such a vast whirlpool of fluid matter, as that philosopher supposed, had existed, it is absolutely impossible, without a continued miracle, but it must have carried along with it the comets as well as the planets. The manner in which Sir Isaac Newton demonstrates the operation of the projectile and gravitating forces upon the planets so as to direct them

them in circles round the sun, is by supposing the orbit they describe divided into a vast number of infinitely small parts, each of which will not differ from a right line, and consequently the whole curve may be considered as consisting of the diagonals of parallelograms infinitely small, one of whose sides is represented by the space the planet would have moved through by the projectile force alone, and the other by that which it would have moved through by the force of gravity alone in the same time. Those who want to enter deeply into this speculation will find themselves amply satisfied by looking into Newton's *Principia*; but for the sake of those who may be less learned, and yet want to have a general knowledge of these things, we subjoin the following explanation by Mr Ferguſon.

88
Explanation by Mr Ferguſon.

Plate XLIV.
fig. 3.

"From the uniform projectile motion of bodies in straight lines, and the universal power of attraction which draws them off from these lines, the curvilinear motions of all the planets arise. If the body A be projected along the right line A B X, in open space, where it meets with no resistance, and is not drawn aside by any other power, it will for ever go on with the same velocity, and in the same direction. For the force which moves it from A to B in any given time, will carry it from B to X in as much more time, and so on, there being nothing to obstruct or alter its motion. But if, when this projectile force has carried it, suppose to B, the body S begins to attract it, with a power duly adjusted, and perpendicular to its motion at B, it will then be drawn from the straight line A B X, and forced to revolve about S in the circle B Y T U. When the body A comes to U, or any other part of its orbit, if the small body *u*, within the sphere of U's attraction, be projected as in the right line Z, with a force perpendicular to the attraction of U, then *u* will go round U in the orbit W, and accompany it in its whole course round the body S. Here, S may represent the sun, U the earth, and *u* the moon.

"If a planet at B gravitates, or is attracted, toward the sun, so as to fall from B to *y*, in the time that the projectile force would have carried it from B to X, it will describe the curve B Y by the combined action of these two forces, in the same time that the projectile force singly would have carried it from B to X, or the gravitating power singly have caused it to descend from B to *y*; and these two forces being duly proportioned, and perpendicular to each other, the planet obeying them both will move in the circle B Y U. To make the projectile force balance the gravitating power so exactly, as that the body may move in a circle, the projectile velocity of the body must be such as it would have acquired by gravity alone in falling through half the radius of the circle.

"But if, whilst the projectile force would carry the planet from B to *b*, the sun's attraction (which constitutes the planet's gravitation) should bring it down from B to *i*, the gravitating power would then be too strong for the projectile force, and would cause the planet to describe the curve B C. When the planet comes to C, the gravitating power (which always increases as the square of the distance from the sun S diminishes) will be yet stronger for the projectile force; and, by conspiring in some degree therewith, will accelerate the planet's motion all the way from C to K; causing it to describe the arcs B C, C D, D E, E F,

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&c. all in equal times. Having its motion thus accelerated, it thereby gains so much centrifugal force, or tendency to fly off at K in the line K *k*, as overcomes the sun's attraction: and the centrifugal force being too great to allow the planet to be brought nearer the sun, or even to move round him in the circle K L m n, &c. it goes off, and ascends in the curve K L M N, &c. its motion decreasing as gradually from K to B, as it increased from B to K, because the sun's attraction now acts against the planet's projectile motion just as much as it acted with it before. When the planet has got round to B, its projectile force is as much diminished from its mean state about G or N, as it was augmented at K; and so the sun's attraction being more than sufficient to keep the planet from going off at B, it describes the same orbit over again, by virtue of the same forces or powers.

"A double projectile force will always balance a quadruple power of gravity. Let the planet at B have twice as great an impulse from thence towards X, as it had before; that is, in the same length of time that it was projected from B to *b*, as in the last example, let it now be projected from B to *c*; and it will require four times as much gravity to retain it in its orbit: that is, it must fall as far as from B to *a* in the time that the projectile force would carry it from B to *c*; otherwise it could not describe the curve BD, as is evident by the figure. But, in as much time as the planet moves from B to C in the higher part of its orbit, it moves from I to K, or from K to L, in the lower part thereof; because, from the joint action of these two forces, it must always describe equal areas in equal times throughout its annual course. These areas are represented by the triangles BSC, CSD, DSE, ESF, &c. whose contents are equal to one another, quite round the figure.

"As the planets approach nearer the sun, and recede farther from him, in every revolution; there may be some difficulty in conceiving the reason why the power of gravity, when it once gets the better of the projectile force, does not bring the planets nearer and nearer the sun in every revolution, till they fall upon and unite with him; or why the projectile force, when it once gets the better of gravity, does not carry the planets farther and farther from the sun, till it remove them quite out of the sphere of his attraction, and cause them to go on in straight lines for ever afterward. But by considering the effects of these powers as described in the two last articles, this difficulty will be removed. Suppose a planet at B to be carried by the projectile force as far as from B to *b*, in the time that gravity would have brought it down from B to *i*: by these two forces it will describe the curve B C. When the planet comes down to K, it will be but half as far from the sun S as it was at B; and therefore, by gravitating four times as strongly towards him, it would fall from K to V in the same length of time that it would have fallen from B to *i* in the higher part of its orbit, that is, through four times as much space; but its projectile force is then so much increased at K, as would carry it from K to *k* in the same time; being double of what it was at B; and is therefore too strong for the gravitating power, either to draw the planet to the sun, or cause it go round him in the circle K L m n, &c. which would require its falling from K to *u*, thro'

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a

a greater space than gravity can draw it, whilst the projectile force is such as would carry it from K to k; and therefore the planet ascends in its orbit KLMN, decreasing in its velocity for the causes already assigned.

"By the above-mentioned law, bodies will move in all kinds of ellipses, whether long or short, if the spaces they move in be void of resistance. Only, those which move in the longer ellipses, have so much the less projectile force impressed upon them in the higher parts of their orbits; and their velocities, in coming down towards the sun, are so prodigiously increased by his attraction, that their centrifugal forces in the lower parts of their orbits are so great as to overcome the sun's attraction there, and cause them to ascend again towards the higher parts of their orbits; during which time, the sun's attraction acting so contrary to the motions of those bodies, causes them to move slower and slower, until their projectile forces are diminished almost to nothing; and then they are brought back again by the sun's attraction, as before.

86
Gravity and
projectile
force ac-
counted for.

"The sun and planets mutually attract each other: the power by which they do so we call *gravity*. But whether this power be mechanical or not, is very much disputed. Observation proves, that the planets disturb one another's motions by it; and that it decreases according to the squares of the distances of the sun and planets; as light, which is known to be material, likewise does. Hence gravity should seem to arise from the agency of some subtle matter pressing towards the sun and planets, and acting, like all mechanical causes, by contact. But, on the other hand, when we consider that the degree or force of gravity is exactly in proportion to the quantities of matter in those bodies, without any regard to their bulks or quantities of surface, acting as freely on their internal as external parts; it seems to surpass the power of mechanism; and to be either the immediate agency of the Deity, or effected by a law originally established and impressed on all matter by him. But some affirm that matter, being altogether inert, cannot be impressed with any law even by almighty power; and that the Deity, or some subordinate intelligence, must therefore be constantly impelling the planets toward the sun, and moving them with the same irregularities and disturbances which gravity would cause, if it could be supposed to exist. But, if a man may venture to publish his own thoughts, it seems to me no more an absurdity, to suppose the Deity capable of infusing a law, or what laws he pleases, into matter, than to suppose him capable of giving it existence at first. The manner of both is equally inconceivable to us; but neither of them imply a contradiction in our ideas, and what implies no contradiction is within the power of Omnipotence.

"That the projectile force was at first given by the Deity, is evident. For, since matter can never put itself in motion, and all bodies may be moved in any

direction whatsoever; and yet the planets, both primary and secondary, move from west to east, in planes nearly coincident; whilst the comets move in all directions, and in planes very different from one another; these motions can be owing to no mechanical cause or necessity, but to the free will and power of an intelligent Being.

"Whatever gravity be, it is plain that it acts every moment of time: for if its action should cease, the projectile force would instantly carry off the planets in straight lines from those parts of their orbits where gravity left them. But, the planets being once put into motion, there is no occasion for any new projectile force, unless they meet with some resistance in their orbits; nor for any amending hand, unless they disturb one another too much by their mutual attractions.

"It is found that there are disturbances among the planets in their motions, arising from their mutual attractions when they are in the same quarter of the heavens; and the best modern observers find that our years are not always precisely of the same length (A). Besides, there is reason to believe that the moon is somewhat nearer the earth now than she was formerly; her periodical month being shorter than it was in former ages. For our astronomical tables, which in the present age shew the times of solar and lunar eclipses to great precision, do not answer so well for very ancient eclipses. Hence it appears, that the moon does not move in a medium void of all resistance; and therefore her projectile force being a little weakened, whilst there is nothing to diminish her gravity, she must be gradually approaching nearer the earth, describing smaller and smaller circles round it in every revolution, and finishing her period sooner, although her absolute motion with regard to space be not so quick now as it was formerly: and, therefore, she must come to the earth at last; unless that Being which gave her a sufficient projectile force at the beginning, adds a little more to it in due time. And, as all the planets move in spaces full of ether and light, which are material substances, they too must meet with some resistance. And therefore, if their gravities are not diminished, nor their projectile forces increased, they must necessarily approach nearer and nearer the sun, and at length fall upon and unite with him.

87
Planets di-
sturb one
another's
motions.

88
Must neces-
sarily ap-
proach the
sun.

"Here we have a strong philosophical argument against the eternity of the world. For, had it existed from eternity, and been left by the Deity to be governed by the combined actions of the above forces or powers, generally called *Laws*, it had been at an end long ago. And if it be left to them, it must come to an end. But we may be certain that it will last as long as was intended by its Author, who ought no more to be found fault with for framing so perishable a work, than for making man mortal (B)."

89
World not
eternal.

Though this system hath now obtained in a manner universal

(A) If the planets did not mutually attract one another, the areas described by them would be exactly proportionate to the times of description. But observations prove, that these areas are not in such exact proportion, and are most varied when the greatest number of planets are in any particular quarter of the heavens. When any two planets are in conjunction, their mutual attractions, which tend to bring them nearer to one another, draws the inferior one a little farther from the sun, and the superior one a little nearer to him; by which means, the figure of their orbits is somewhat altered; but this alteration is too small to be discovered in several ages.

(B) A difficulty of this kind we find obviated in a pamphlet intitled *Thoughts on General Gravitation, &c. &c. &c.* The author of this performance, after considering how necessary a projectile force is to counteract the power of gravity acting

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Arguments
against the
Newtonian
hypothesis.

universal credit, it was not without opposition at first; nor are there wanting at this day some who not only object to it, but charge the hypothesis of universal gravity or attraction itself with being an absurdity. As we reckon ourselves bound to strict impartiality in every dispute, and consequently to give the opinions and arguments of one party as well as another, that every reader may be enabled to judge for himself, we hope it will give no just cause of offence if we mention the principal arguments that have been made use of against our celebrated philosopher.

or
By Leib-
nitz, &c.

At the first appearance of the Newtonian system, Leibnitz, and other learned men abroad, objected to his principle of attraction, as being an unknown power of which Sir Isaac himself did not pretend to know the cause; and consequently that it was of the same nature with the occult qualities formerly made use of, and which were only another way of expressing ignorance. To avoid the force of this objection, it was answered on Sir Isaac's part, that by the word *attraction* was meant no more than the bare effect or action of some cause not yet discovered, and that philosophers ought to search for the cause. On the other hand, it was replied, that if attraction was the effect of any natural cause, such cause behoved to be material, and of consequence the matter of which that cause was formed behoved to be destitute of attraction. If this was the case, say they, Sir Isaac Newton was in the wrong to make gravity or attraction an universal law of matter, when it is only partial: He ought to have contented himself with observing the phenomena of the celestial motions, without pretending to assign any cause for them at all.

This may suffice to give a short view of the dispute concerning attraction as an effect. With regard to it as a *cause*, (for to tell the truth, most Newtonian philosophers, and even Sir Isaac Newton himself, have spoken of it both as cause and effect (c): "If (say they) we affirm with Dr Cotes, that it is the most simple of causes, beyond which we cannot penetrate, it is undoubtedly right to call it an *invisible, hidden, or occult cause, property, or quality*: and therefore explaining phenomena by *attraction*, is only explaining them by occult qualities; or, in other words, owning our ignorance. If we believe what Sir John Pringle hath said in his discourse concerning the attraction of mountains, namely, that gravity hath been long acknowledged by the Royal Society to be "a *quality* impressed by the Creator on all matter, whether of the earth or of the heavens, whether at rest or in motion;" then there is no doubt that the Royal Society acknowledges it also to be an invisible quality, a hidden quality, or an *occult* quality, according as we please to express ourselves. If, with Mr Ferguson, we call it a *law* impressed by the Creator on all matter, there is no difference, except merely in the word, between an occult *law* and an occult *quality*. If, as Mr Baxter and others suppose, attraction is the immediate operation of God himself, then the *occultation* is not only infinitely increased, but we have this additional inconvenience, that the Deity is chargeable with doing whatever is done by means of attraction, whether good or evil."

These are the general objections that are made to the doctrine of attraction itself. In particular, it is said to be demonstrably insufficient to produce even the common phenomena of falling bodies; but these ob-

5 E 2 jections

acting on the planets, applies the same rule to the sun, and to the stars which are supposed to be other suns. As we cannot fix the boundaries of gravitation, he thinks it reasonable to suppose that all the suns in the universe have a projectile force as well as the planets, and gravitate towards a common centre, round which they describe orbits, carrying with them their systems of planets, as the primary planets carry their secondaries along with them in their revolutions round the sun. That something is necessary to counteract the gravitation of the sun towards the planets, is certain; for tho' the projectile power hinders the planets from coming to the sun, yet what hinders the sun from coming to the planets, as Sir Isaac Newton shews that he is continually moved from his place by their attraction? Difficulties of this kind probably occurred to Sir Isaac himself, when he proposed it as a query, "What hinders the fixed stars from falling upon one another?" This query, which is taken for the motto of the abovementioned pamphlet, is there answered in the manner just now related; and to shew the credibility of the hypothesis, it is urged, that the stars "Sirius, Castor, Procyon, Regulus, alpha Aquilæ, Pollux, Arcturus, and many others, are found to be all moving through absolute space with incredible velocity, and the whole stars in the firmament are supposed to do so by the first astronomers of this age." This assertion is supported by the testimonies of Dr Halley, Le Monier, Maskelyne, and Mayer, who have observed changes in the places of the fixed stars; but till these changes are fully ascertained and determined, little can be said upon this subject.

(c) This will appear by the following quotations from the writings of Sir Isaac himself, and several of the most eminent of his followers.

Sir Isaac Newton. "Gravity exists and acts." *Princip.* p. ult.

Dr Friend. "In explaining gravity, Newton has demonstrated it to arise from an attractive force." *Phil. Transf.* N^o 331.

M. Maupertuis. "It should be remembered in justice to Sir Isaac Newton, he has never considered attraction as an explanation of gravity. He considers it not as a *cause*, but as an *effect*." *Astron. Phys.* par. M. de Ganiliches. p. 348.

Dr Cotes. "Gravity is the most simple of *causes*." *Princip.* pref. p. 9.

Dr Clarke. It has often been distinctly declared, that "by the term *attraction* we do not mean to express the *cause* of bodies tending toward each other, but barely the *effect*, the *effect itself*, the *phenomenon*, or *matter of fact*." p. 335.

Dr Desaguliers. "Attraction seems to be settled by the great Creator as the *first of second causes*." *Phil. Transf.* N^o 454.

Mr Rowning. "When we use the term *attraction*, we do not determine the physical cause of it, but use it to signify an *effect*." Vol. 1. p. 17.

Sir Isaac Newton. "There are *agents in nature* able to make the particles of bodies stick together by very strong attractions, and it is the business of experimental philosophy to find them out."

Dr Desaguliers. "We are not solicitous about the *cause of attraction*." *Phil. Transf.* N^o 454.

Dr Friend. "I believe attraction will always be *occult*." *Phil. Transf.* N^o 331.

jections come more properly to be noticed under the article GRAVITY. As to the particular phenomenon in question, namely, the revolutions of the celestial bodies in orbits nearly circular, the following objections are raised against the Newtonian scheme.

92
Gravitation
and projec-
tile force
objected to.

1. "It is highly absurd, not to say impious, to think of compounding a motion by a mixture of Divine and created power. If the Deity projects the planets in a right line, how can a created *quality* make them deviate from that line? If we are to suppose the Deity to project them at all, why do we not suppose him to project them in a circular or elliptical direction? Or can God only project bodies in a right line as men can do?"

2. "The Newtonian method of explaining the celestial motions by the diagonals of parallelograms infinitely small, involves us in a contradiction no less than that of supposing the radii of a circle to be parallel to one another. This is evident from an inspection of fig. 3, Plate XLIV. When the planet sets out from B, it is drawn by the force of gravity towards S in the direction SB. When it arrives at Y, gravity no longer draws it in the direction SB, or XY, but in that of a radius drawn from S to Y. Unless therefore we suppose these two radii to be parallel to one another, which is evidently absurd, we cannot say that the planet moves from B to Y by a force compounded of those represented by BX and BY; as the latter is every moment varying in its direction. By supposing the arches to be infinitely small indeed, we may think to get over the difficulty; but it is a mere deception. Perhaps it may be thought no absurdity to say, that one radius of a circle is parallel to another drawn at an infinitely small distance from it: but to a Being whose eyes are *infinitely good*, the absurdity will appear as great as it does to us to say that the lines SD and SB are parallel to one another; and whatever appears an absurdity to him, will also appear an absurdity to us when multiplied so as to become visible.

3. "Granting that there is no absurdity in the abovementioned supposition, it is absolutely impossible that the power of gravity, acting in the manner which it is found to do on earth, can be the means of retaining any body in a circular or any other kind of orbit, but must at last overcome the strongest projectile force we can imagine. Neither will any law, by which we can suppose this power to be regulated, answer our purpose better. If we suppose gravity to be a power acting uniformly, the planet will run off in a curve approaching every moment nearer to a straight line. If it is accelerated in any proportion whatever, the projectile force, however strong, must at last be overcome; and the planet for some time behaved to describe a strange kind of curve, very different either from a circle, parabola, or ellipsis, and would at last come to the centre.

5th Plate
XLII. fig. 1.

"To illustrate this, let S represent the sun, diffusing the attractive rays SB, Sa, Sb, &c. Let us next suppose a planet projected from B, in the direction Bi, in such a manner that it would move through the spaces Ba, Bb, Bc, &c. by the force of projection alone, in the same times that it would describe the spaces B1, B2, B3, &c. by the force of gravity alone. According to the laws of compound forces, therefore, it must describe the diagonal of the parallelogram Bx, in the same time that it would have described the side

Bz by the projectile force alone. The diagonal of a right-angled parallelogram is always longer than its side: the planet therefore has, in the same time in which it would have described the space Ba, described that of Bx, which is larger; and consequently has received an addition of velocity. Let us now suppose the force of gravity to be annihilated, or to cease its action. It is plain that the planet, by reason of the acceleration it has already received, would move from x to y in the same time that it would have moved from a to b by the projectile force originally impressed upon it. The diagonal of the former parallelogram must therefore become the side of the next one, and if we suppose gravity again to begin its action, the planet will evidently acquire an additional acceleration during the next moment, and thus describe the line yz. For the same reason, it is plain, that the side of every succeeding parallelogram must be the diagonal of the former; and thus the planet will describe the curve Bxyzm, &c. which, if traced out, would become a kind of increasing spiral, that would carry it, after the first half revolution, farther and farther off from the centre S.

"Let us now suppose the gravitating power to accelerate bodies in the celestial regions in the same proportion that it is found to do on earth, and the case will be still worse. We must always consider, that the power of gravity tends to bring bodies to a centre, and not merely away from the tangent line Bi. In proportion, therefore, as the force of gravity is increased, the planet must every moment come nearer the centre than it would have been had it moved uniformly on in the straight line Bi. By the time, therefore, it would have arrived at a by the original force of projection, it must be nearer the centre S by the space B1, and consequently be at x. By the time it would have arrived at b, it must be nearer the centre by the space B4, and consequently be at s. For the same reasons it must come continually nearer and nearer the centre, describing a kind of curve Bxsm, &c. till at last it falls into it altogether.

"This matter is equally capable of being illustrated from the figure by which Mr Fergusson illustrates the Newtonian hypothesis. For, supposing the planet to have moved from B to Y, by the united forces of projection and gravitation, in the same time that it would have moved from B to X by the force of projection, it is plain, that supposing the power of gravity to cease when the planet has arrived at Y, it would then fly off, in a line touching the point Y, with a velocity increased in the proportion of the length of the arch BY to the line BX. Thus the projectile velocity behaved to be for ever increased, if we suppose the gravitating power to act uniformly; and to be entirely destroyed, if it is supposed to increase in the proportion 1, 3, 5, 7, &c. as it is found to do on earth.

"To state this in a different manner: Whatever power, motion, or velocity, receives a continual addition, must ultimately become *infinite*, or greater than any assignable quantity. If the power of gravity, therefore, acts on a planet uniformly, it must continually increase its projectile force, because it obliges it to move in the diagonal of a parallelogram, of which the projectile velocity is one side, and the gravitating power another. The projectile force, therefore, receiving a continual addition, will be ultimately increased beyond all cal-

calculation, and consequently the planet will perpetually remove farther and farther from the centre. If the power of gravity increases every moment after it first begins to act, as it is found to do on earth, it is equally plain that it must ultimately become infinite, and cannot be overcome by any projectile force whatever."

We have already observed, that by the two forces of gravitation and projection, Sir Isaac Newton accounted for the motion of the comets as well as planets. The former he supposed to revolve in very excentric ellipses; on account of their having got only a small degree of projection at first, by which means they are brought very near the sun by the force of gravity, from which they again acquire a prodigious degree of projectile force that carries them off on the other side, till, being gradually weakened by the attractive power, they return; and so on. To this doctrine in the particular instance of comets, Mr Brydone hath made some objections, on the occasion of the comet observed at Palermo, which we shall here lay before our readers in his own words.

"The astronomy of comets, from what I can remember of it, appears to be clogged with very great difficulties, and even some seeming absurdities. It is difficult to conceive, that these immense bodies, after being drawn to the sun with the velocity of a million of miles in an hour; when they have at last come almost to touch him, should then fly off from his body with the same velocity they approach it; and that too, by the power of this very motion that his attraction has occasioned. The demonstration of this I remember is very curious and ingenious; but I wish it may be entirely free from sophistry. No doubt, in bodies moving in curves round a fixed centre, as the centripetal motion increases, the centrifugal one increases likewise:—but how this motion, which is only generated by the former, should at last get the better of the power that produces it; and that too, at the very time this power has acquired its utmost force and energy; seems somewhat difficult to conceive. It is the only instance I know, wherein, the effect increasing regularly with the cause, at last, whilst the cause is still acting with full vigour, the effect entirely gets the better of the cause, and leaves it in the lurch. For the body attracted is at last carried away with infinite velocity from the attracting body:—by what power is it carried away?—Why, say our philosophers, by the very power of this attraction, which has now produced a new power superior to itself, to wit, the centrifugal force. However, perhaps all this may be reconcilable to reason; far be it from me to presume attacking so glorious a system as that of attraction. The law that the heavenly bodies are said to observe, in describing equal areas in equal times, is supposed to be demonstrated; and by this it would appear, that the centripetal and centrifugal forces alternately get the mastery of one another.

"However, I cannot help thinking it somewhat hard to conceive, that gravity should always get the better of the centrifugal force, at the very time that its action is the smallest, when the comet is at its greatest distance from the sun; and that the centrifugal force should get the better of gravity, at the very time that its action is the greatest, when the comet is at its nearest point to the sun.

"To a common observer, it would rather appear, that the sun, like an electric body, after it had once charged the objects that it attracted with its own effluvia or atmosphere, by degrees loses its attraction, and at last even repels them; and that the attracting power, like what we likewise observe in electricity, does not return again till the effluvia imbibed from the attracting body is dispelled or dissipated; when it is again attracted, and so on alternately. For it appears (at least to an unphilosophical observer) somewhat repugnant to reason to say that a body flying off from another body some thousands of miles in a minute, should all the time be violently attracted by that body, and that it is even by virtue of this very attraction that it is flying off from it.—He would probably ask, What more could it do, pray, were it really to be repelled?

"Had the system of electricity, and of repulsion as well as attraction, been known and established in the last age, I have little doubt that the profound genius of Newton would have called it to his aid; and perhaps accounted in a more satisfactory manner for many of the great phenomena of the heavens. To the best of my remembrance, we know of no body that possesses, in any considerable degree, the power of attraction, that in certain circumstances does not likewise possess the power of repulsion; the magnet, the tourmalin, amber, glass, and every electrical substance. Now, from analogy, as we find the sun so powerfully endowed with attraction, why may we not likewise suppose him to be possessed of repulsion? Indeed, this very power seems to be confessed by the Newtonians to reside in the sun in a most wonderful degree; for they assure us he repels the rays of light with such amazing force, that they fly upwards of 80 millions of miles in seven minutes. Now why should we confine this repulsion to the rays of light only? as they are material, may not other matter brought near his body be affected in the same manner? Indeed one would imagine, that their motion alone would create the most violent repulsion; and that the force with which they are perpetually flowing from the sun, would most effectually prevent every other body from approaching him; for this we find is the constant effect of a rapid stream of any other matter. But let us examine a little more his effects on comets. The tails of these bodies are probably their atmospheres rendered highly electrical, either from the violence of their motion, or from their proximity to the sun. Of all the bodies we know, there is none in so constant and so violent an electrical state as the higher regions of our own atmosphere. Of this I have been long convinced; for, send up a kite with a small wire about its string, only to the height of 12 or 1300 feet, and at all times it will produce fire, as I have found by frequent experience; sometimes when the air was perfectly clear, without a cloud in the hemisphere; at other times, when it was thick and hazy, and totally unfit for electrical operations below. Now, as this is the case at so small a height, and as we find the effect still grows stronger in proportion as the kite advances, (for I have sometimes observed, that a little blast of wind, suddenly raising the kite about 100 feet, has more than doubled the effect) what must it be in very great elevations? Indeed we may often judge of it from the violence with which the clouds are agitated, from the meteors formed above the regions of

the clouds, and particularly from the *Aurora Borealis*, which has been observed to have much the same colour and appearance as the matter that forms the tails of comets.

"Now what must be the effect of so vast a body as our atmosphere, made strongly electrical, when it happens to approach any other body? It must always be either violently attracted or repelled, according to the positive or negative quality (in the language of electricians) of the body that it approaches.

"It has ever been observed, that the tails of comets (just as we should expect from a very light fluid body attached to a solid heavy one) are drawn after the comets as long as they are at a distance from the sun; but as soon as the comet gets near his body, the tail veers about to that side of the comet that is in the opposite direction from the sun, and no longer follows the comet, but continues its motion sideways, opposing its whole length to the medium through which it passes, rather than allow it in any degree to approach the sun. Indeed, its tendency to follow the body of the comet is still observable, were it not prevented by some force superior to that tendency; for the tail is always observed to bend a little to that side from whence the comet is flying. This perhaps is some proof too, that it does not move in an absolute vacuum.

"When the comet reaches its perihelion, the tail is generally very much lengthened; perhaps by the rarefaction from the heat; perhaps by the increase of the sun's repulsion, or that of his atmosphere. It still continues projected, exactly in the opposite direction from the sun; and when the comet moves off again to the regions of space, the tail, instead of following it, as it did on its approach, is projected a vast way before it, and still keeps the body of the comet exactly opposed betwixt it and the sun; till by degrees, as the distance increases, the length of the tail is diminished; the repulsion probably becoming weaker and weaker.

"It has likewise been observed, that the length of these tails are commonly in proportion to the proximity of the comet to the sun. That of 1680 threw out a train that would almost have reached from the sun to the earth. If this had been attracted by the sun, would it not have fallen upon his body, when the comet at that time was not one fourth of his diameter distant from him? but, instead of this, it was darted away to the opposite side of the heavens, even with a greater velocity than that of the comet itself. Now what can this be owing to, if not to a repulsive power in the sun, or his atmosphere?

"And indeed it would at first appear but little less absurd, to say that the tail of the comet is all this time violently attracted by the sun, although it be driven away in an opposite direction from him, as to say the same of the comet itself. It is true, this repulsion seems to begin much sooner to affect the tail than the body of the comet; which is supposed always to pass the sun before it begins to fly away from him, which is by no means the case with the tail. The repulsive force, therefore, (if there is any such), is in a much less proportion than the attractive one; and probably just only enough to counterbalance the latter, when these bodies are in their perihelions, and to turn them so much aside as to prevent their falling into the body of the sun. The projectile force they have acquired will

then carry them out to the heavens, and repulsion probably diminishing as they recede from the sun's atmosphere, his attraction will again take place and retard their motion regularly, till they arrive at their aphelia, when they once more begin to return to him."

The only system which appears at present in opposition to the Newtonian is that which we formerly called *Mechanical*, and was first published by John Hutchinson Esq; with a pretence of its being extracted from the sacred writings. He was cotemporary with Sir Isaac, and expressed no small invidiousness against him, but without success; his unintelligible manner of writing rendering him in a great measure inaccessible even to his friends, and his malevolence disgusting every body else. The system, however, still continues, with some considerable alterations and improvements. The most confident account we have been able to procure of it as it stands at present, is what follows.

"The motions of the celestial bodies are all of them entirely dependent on the action of the sun, and this action consists in the emission of his light. As we see that no fire can be preserved on earth without the influx of air, so it is reasonable to think that the sun himself cannot be supported without the influx of a stream of air from every side, proportioned to his immense magnitude. This air, by which the sun's heat and light are preserved, is of a purer nature than what we breathe, as being perfectly destitute of aqueous and other vapours with which our air is always loaded. The matter of which the fire, the light, and the air, are composed, is ultimately the same: the only difference we perceive is, that when the ethereal matter appears to us as fire or light, it acts with violence from a centre to a circumference; when as air, it acts more mildly, as from a circumference to a centre. The reason of this apparent mildness of the action of air, in comparison with that of fire or light, is owing only to the grossness of the particles of the former which make its action less sensible; as a push with the head of a pin is much less sensible than one with the point of it, though the one be given with no more force than the other.

"The manner in which the gross air is formed, appears from the following consideration. The light being emitted from the sun, in particles inconceivably minute, must very soon strike against other particles of the same nature with itself, of which the universe is supposed to be perfectly full, which either are not moving at all, or with a slower motion, or in a contrary direction. When a particle has thus lost its motion in a direct line from the sun, it will move along with the particle by which it was stopped, as one body. The reason of this is the pressure of the circumambient fluid; for till the violent action of the light from the sun overcomes the pressure behind and on each side, the two particles cannot separate, having no motion but what is given them by the rest of the fluid. The consequence of this is, that such particles must every moment come nearer the sun: for, the universe being supposed an absolute plenum, if any particle of matter goes out from the centre, another must return to it, otherwise there could be no motion. The light, therefore, consisting of all those particles which have a tendency outwards, cannot possibly be emitted without displacing those which have no such tendency, and consequently bringing them nearer to the centre: and thus they must always continue to approach, till at last

24
Hutchinsonian, or mechanical system.

25
Formation of air.

last they fall into it altogether, where, the action being extremely violent, and the pressure outwards equivalent to that inwards, the cohesion of every particle of air must be dissolved, and the matter reduced to its original fineness and fluidity, when it is again sent forth; and so on.

“ Thus it appears that the light consists of the very finest particles, each of which moves by itself, and unconnected with any other. When two or more particles of light lose their motion while contiguous to one another, they cannot be separated till they come to the sun himself, or at least to some place where the action from the centre is nearly equal to that from the circumference. This, it is evident, can only take place perfectly in the sun himself; and hence, though our common fires do reduce the air to a greater degree of fineness than when it enters them, they are far from being sufficient to reduce it to the utmost degree of fineness possible; therefore their light is always weak and obscure, compared with that of the sun; and for the same reason, the sun-beams excite a stronger heat than can be raised by any furnace. Hence it is easy to see, that between the light of the sun, and the grossest air, there may, and necessarily will, be fluids of all degrees of grossness or density, in which sense only the word *density* can be used on this plan. Each of these fluids will constitute a *natural power*, or secondary cause, which will act according to its degree of density in particular circumstances, and thus be subservient to the production of different natural phenomena, according to the original appointment of the Creator. A fluid of this intermediate degree of density we evidently see in electricity, which appears vastly more subtle than air, though not quite so much as light.

“ Thus we have considered the universe as consisting only of the ethereal matter which appears to us in the different modifications of fire, light, air, electric fluid, fixed air, &c. Let us now suppose a planet, or any other porous body, our earth for instance, introduced into it, or created out of nothing by Divine power. Immediately upon its immersion into this mixture of fluids, it is evident that the finer parts would be impelled by the pressure of the rest into the smallest pores of the body, while, by the pressure of the grosser fluids, its particles would be brought as close as those of the finest ethereal fluid which had already insinuated themselves would permit. The consequence of this behaved to be the formation of an *atmosphere* denser than that of the common ethereal fluid with which the whole universe is filled; for the finer parts being as it were drained out from among that part of the common fluid, and insinuating themselves into the pores of the earth or other planet, the more gross fluids must necessarily be driven towards the surface, where they will remain, without a possibility of their being separated; unless the planet should fall into the sun; because, in any other part of the creation, the pressure from without must be greater than that from within, and consequently let us suppose the atmosphere to be ever so much rarefied, it never could be destroyed, or leave the body to which it originally belonged.

“ Having now seen how, on the foregoing principles, every planet must be surrounded with a particular atmosphere of its own, distinct from that of the common ethereal fluid, which we shall henceforth call the *atmosphere of the sun*, we must now consider the

consequences. In the first place, it is obvious, that by means of this atmosphere the violent action of the sun's light will be moderated, as well as of the particles of air that are continually returning towards him; so that, let their impulse be ever so strong, they cannot act on the planet or its inhabitants but through the medium of the atmosphere; and thus the earth becomes a comfortable habitation, when it would otherwise be utterly unfit for the residence of living creatures. The atmosphere of the sun is, as we have already seen, in a perpetual motion, the one part going out, and the other returning. The earth, with its atmosphere, or any other planet, therefore, cannot be supported in any part of the creation where this action subsists, but that its fore part, or that which is turned towards the sun, must be subject to the impulse of those particles of light which are issuing out from him, as the back-part is to the impulse of the particles of air returning towards him. By the one it is pushed out from, and by the other impelled towards, the sun; but as these two impulses are necessarily equal to one another, the planet must still continue at the same distance, without being able to approach or recede in the least. Nevertheless, as both impulses are inconceivably violent, the planet must make an effort to get away, proportionable to the strength of both of them. It must therefore fly off at the side, because the resistance there is least (it being easier to cross a stream at right angles, than to go directly against it); and having once begun to do so, it must continue its motion, as long as the cause subsists by which it was originally produced; and as the impetus of the light ascending, and the air descending, are in all places equal, it is plain the planet can neither approach nearer to, nor recede farther from, the sun, but must continually circulate round him.

“ In this way it is easy to see how the earth or any other planet might continue to move round the sun in a perfect circle; but to explain the planetary motions in elliptic orbits, requires a farther consideration. We have hitherto supposed the planet to be perfectly impenetrable even by the finest part of the solar atmosphere: but it can scarce be supposed that any body in nature is perfectly so; and a little consideration will easily shew us, that, unless the body is perfectly impenetrable, it must describe an ellipsis, more or less excentric, according to its degree of penetrability. The reason of this is, that, in proportion to the transmission of the finer parts, the impulse of the grosser ones from behind becomes stronger, and consequently the planet must approach the sun, till, the impulse of the light becoming too violent that by its plentiful transmission the air behind is somewhat repelled, and of consequence the pressure from that quarter lessened, the planet gradually recedes to its former distance.

“ That this is really the case, is evident to our senses in the comets. Being formed in a different manner from the planets, they transmit great part of the light, and finer parts of the solar atmosphere: of consequence their lateral motion is but small, and they move almost directly towards the sun. The nearer they approach him, the greater must their velocity be; for it is demonstrable, that the quantity of light emitted from any luminous body, and of consequence the impulse of it, increases in a duplicate proportion to the decrease of distance from that body. If the impulse of light from

67
Circular or-
bits account-
ed for.

66
Of the at-
mospheres
of planets.

68
or Elliptical
orbits.

69
Motions
and tails of
the comets
accounted
for.

the

the sun increases in this manner, so must the impulse of the air towards him; for as the quantity of light emitted is always equal to that of the air which flows in, the impetus of the one must always be equal to that of the other. As the comet gets nearer the sun, the finer parts of the solar atmosphere are transmitted in great quantity, and form its tail, which is nothing else than a stream of electric fluid with which the celestial regions every where abound, and which is driven with violence through the body of the comet by the impulse of the light before it. It is not to be supposed that such an immense stream of this matter can be discharged without affecting the air behind the comet. We see that this is the case by the bending of the tail, which indicates a very violent resistance; and this resistance, together with the impulse of the light before, regulates the motion of the comet, and prevents it from flying with the velocity of light itself. When the comet draws near the sun, the tail increases prodigiously; and the body, being now heated, begins to repel the air on all sides; in consequence of which, a lateral motion is at first begun, as if it was to describe a circle round the sun at a very small distance from his body; but the heat still increasing, it is at last hurried off by the impulse of the light, while the electric stream goes before, as it were to clear its way, and keep off the too great pressure of the air which would retard its progress. As the comet gets farther from the sun into the more dense regions of his atmosphere, the heat begins to abate, and the gross air to act with its full force; and then, most of the finer parts of his atmosphere being again transmitted imperceptibly, it begins to circulate for a little way, and soon descends again towards the sun.

“With this hypothesis, which consists merely in reasoning analogically from what we observe on earth to what is observed in the celestial motions, all the phenomena of nature are in perfect conformity. By it the revolutions of the planets round their axes is easily accounted for, and for which the Newtonian philosophers have never assigned any reason. Such a revolution must be the necessary consequence of the resistance made to the planet's motion, while it flies off from between the ascending stream of light, and the descending one of air. According to this hypothesis too, the velocities of the planets nearest the sun ought to be greatest in their orbits, and their revolutions on their axes the slowest. This is confirmed by experience; Mercury moves swifter than Venus, and Venus swifter than the earth. If Mr Bianchini's observations also are to be credited, Venus moves on her axis 23 times slower than the earth. This slowness in the diurnal revolutions necessarily follows from the greater fluidity of the solar atmosphere near the body of the sun than at a distance; and consequently its being less able to make a lateral resistance. For the same reason, the superior planets, Mars, Jupiter, and Saturn, ought to revolve more slowly in their orbits, and more quickly round their axis. This is remarkably the case with Jupiter, who revolves round his axis with great rapidity, though his motion in his orbit is much slower than that of the earth. Mars seems to be an exception; for though he moves more slowly in his orbit, his motion

round his axis is also a little slower than that of the earth. But here we must consider the size of the planet, which is greatly inferior to that of the earth; so that though he moves in a denser medium than the earth does, yet the smallness of his body, and slowness of motion in his orbit, lessen the lateral resistance in such a manner, that his diurnal revolution cannot be completed in such a short time as it could be were his body equal to the earth in size. The magnitude of Jupiter's body also, as well as the density of the medium he moves in, probably contribute to his quick diurnal revolution, which is vastly more swift than that of either the earth or Mars. As for Saturn and Mercury, no spots having ever been observed on them whereby their diurnal revolution could be ascertained, nothing can be determined with regard to them in this particular.

“It remains now only to account for the motions of the secondary planets round their primaries; and here there are some appearances which make it probable that the secondary planets are retained in their orbits by the power of electricity. It is observed, that our moon keeps always the same side towards the earth; and this any small electrified body is constantly observed to do towards the body which electrifies it. It hath been observed, that the moons of Jupiter, when passing over his disk, appear to us like black spots; whence it is probable that only one side of the secondary planets is capable of reflecting the light, and therefore that all of them keep constantly the same side towards their primaries. That the combined powers of light and electricity are capable of producing a motion round a centre, may be proved by experiment, which in all cases is worth a thousand speculations.

“Let a light hollow ball of cork covered over with brass or gold leaf be suspended by a pretty long silk thread, so as just to touch the knob of an electrified vial placed on a table. It will instantly be driven off to some distance, and, after a few vibrations, will remain at rest. If a lighted candle is now placed at some distance behind it, so that the flame of the candle may be nearly as high as the knob of the vial, the cork will instantly be agitated, and, after some irregular motions, will describe a curve round the knob of the vial, seemingly of the elliptic kind; and this it will continue to do, sometimes moving in one direction, sometimes in another, till the force of electricity in the vial is almost exhausted. It must be owned, that the circulation here is far from being regular; for sometimes the ellipsis is very excentric, sometimes it hath very little excentricity; very often the cork ball will strike upon the knob of the vial, &c. but these irregularities can only be attributed to want of skill in the operator to adjust the forces to one another in a proper manner. But if we, by a few sparks from an electric conductor, can make a cork perform some hundreds of revolutions in an irregular manner round the knob of a vial, what cannot the Deity do, who hath the whole powers of light and electricity at his command, who knows their nature perfectly, and whose mechanical skill hath no limits besides the nature of the materials he employs (D).

“The electric power is by most philosophers allowed to have a principal share in all the natural operations

(D) This experiment we have repeated with success; but whether the consequences deduced from it by the author of this account can be justly drawn, we must submit to better judges.

100
Motions of
the planets
on their axes
accounted
for.

101
Motions of
the second-
ary planets
accounted
for.

102
Electrical
experiment
to confirm
the hypo-
thesis.

tions on this earth. Experience shews, that, so far from diminishing, it grows much stronger the higher we ascend. As we can, therefore, set no bounds to this increase of power, it seems most reasonable to suppose that the moon receives it from the earth, as the cork ball in the experiment receives it from the knob of the vial; and that, being continually drawn off by the fun, it occasions the circulation of the moon in a similar, though much more regular, manner."

Having now given an account of the principal systems that have appeared, and recounted a great number of arguments *pro* and *con*, on almost every particular, some general conclusion will naturally be expected from us; as otherwise many readers may think our intention has been to confound them, by advancing a multiplicity of opinions, and leading them into a chaos from which no real knowledge can be extracted.

103
Dispute concerning attraction, of little consequence.

Here we must observe, that all the arguments that ever have been brought against Sir Isaac Newton, only tend to invalidate what is called his *Physical system*, or that part of it which accounts for the phenomena of nature. As for that part of astronomy which consists in the knowledge of the phenomena themselves, what Sir Isaac hath advanced on that head may be looked upon as absolutely certain, and is controverted by nobody. With regard to the dispute concerning attraction, it is of little consequence whether it is cause or effect. The word *attraction*, or some other perhaps equally improper, must be made use of, though we even were already acquainted with the cause of gravity. But it must be remembered, that if attraction is ever discovered to be the effect of a material cause, the cause itself must be destitute of all attraction, or tendency of one part to another, and consequently have very different properties from other matter.

104
Objections to the gravitating and projectile forces, hitherto unanswered.

As to the two powers of gravitation and projection which Sir Isaac Newton assumed as the causes of the planetary revolutions, it is of the utmost importance to a *physical astronomer* to be ascertained whether these forces are capable of producing the effects ascribed to them or not. Objections similar to those above inserted have been published long ago, and we are surprised that no plain and direct answer hath yet been given to them. In 1762, a book entitled "The Principles of Natural Philosophy, &c. by William Jones," made its appearance, in which, among other things, the author undertook to prove, that by a combination of gravitation and projectile force no lasting motion could be produced. As far as we know, no answer has ever been published to this treatise; and upon looking into the Monthly Review, Vol. xxvii. p. 122. we were surprised to find the author censured, rather uncandidly, for controverting Sir Isaac's opinion, while not a single word is offered in answer to his objection, or a hint given where such a thing could be found. In other respects, the Reviewers own that Sir Isaac Newton himself has reasoned very weakly and inconclusively in physical matters. Such concessions as they will necessarily create doubts in the mind of every person that reads them; and therefore particular care ought to be taken in distinguishing where his reasoning is solid and invincible, and where it is not to be regarded. In 1764, another treatise of the same nature, entitled "Short Observations on the Principles and Moving Powers assumed by the present System of Philosophy," was

Vol. I.

published. In this the whole physical part of Sir Isaac's system was attacked and even ridiculed. The author asserted the insufficiency of the two forces of gravitation and projection to keep a planet in its orbit; and, if no other powers than these acted upon it, that it behaved to be hurried off in an eccentric curve. Being unacquainted with any answer to this treatise, we were again obliged to have recourse to the Reviewers; when, in the Review for May 1764, we found the following answer, viz. that the "argument is fallacious, because he doth not take into consideration the time in which gravity acts on moving bodies." Certainly an objection of such a capital nature as this merited a more particular answer, or a direction to some other treatise where such an answer might be found. It is in a manner incredible, that such an excellent mathematician as Sir Isaac Newton should have assumed two powers as first principles, which were utterly insufficient to produce the effect he ascribed to them; and, on the other hand, if they are sufficient, we are entirely at a loss to account for the want of replies to such objections, in the common astronomical treatises, when others, of at least as little consequence, are fully obligated.

105
Newtonian system overturned by admitting the action of electricity in the heavens.

But further, we are afraid, that most philosophers, even the most zealous advocates for Sir Isaac Newton, are inclined to admit the existence of a power in the celestial regions, which must either be the cause of the planetary revolutions, or will utterly destroy their motions. The power we mean is that of electricity. We have already quoted Dr Hamilton conjecturing the tails of comets to be streams of electric matter; and indeed their resemblance to the Aurora Borealis is so great, that it is almost impossible to ascribe the one to electricity, and the other to any different cause. But let us attend to the consequences of this supposition. The tails of comets are immensely large. Sir Isaac Newton computed that of the comet in 1680 to be eighty millions of miles in length. What inconceivable power must not such a stream of electric matter be attended with? We are sure that by its means the comet would attract at the distance of 80,000,000 miles, and how much farther we cannot tell. If we suppose the fun to be the fountain of electricity as well as of heat and light, then undoubtedly he must attract and repel by means of his electric as well as his gravitating power; so that the law of gravity must either be an effect of the electrical power, or behaved to be perpetually interrupted by it. If, with Mr Henly, Cavallo, and others, we suppose the electric fluid to be a modification of the element of fire, there is an end of Sir Isaac Newton's physical system, to all intents and purposes, and downright Hutchinsonianism comes in place of it; for Hutchinson's very first and fundamental principle is, that elementary fire is sent forth as such from the fun, into the planetary regions and beyond them, where it is converted into a different substance, no matter whether air, or electric fluid.

106
Conjectures ought to be indulged with caution.

These things we take notice of, in order to shew how cautious philosophers ought to be in indulging conjectures; as, by so doing, it may often happen, that they will pull down with one hand what they build up with the other. For our own part, we cannot pretend to decide; but as the Newtonian system is so generally made use of for the solution of the celestial phe-

nomena,

nomena, we shall still suppose it to be the only true one, and proceed to give a particular explanation of these phenomena according to it.

Sect. V. The Copernican System particularly considered and explained, on the Newtonian Principles.

THE sun, with the planets and comets which move round him as their centre, constitute the solar system. Those planets which are near the sun, not only finish their circuits sooner, but likewise move faster in their respective orbits, than those which are more remote from him. Their motions are all performed from west to east, in orbits nearly circular.

Pl. XLIII.
fig. 1.

The sun ☉, an immense globe of fire, is placed near the common centre, or rather in the lower focus, of the orbits of all the planets and comets (☿); and turns round his axis in 25 days 6 hours. His diameter is computed to be 890,000 miles; and, by the various attractions of the circumvolving planets, he is agitated by a small motion round the centre of gravity of the system. All the planets, as seen from him, move the same way, and according to the order of signs in the graduated circle ♈ ♉ ♊ ♋ &c. which represents the great ecliptic, or circle annually described by the earth round the sun; but, as seen from any one planet, the rest appear sometimes to go backward, sometimes forward, and sometimes to stand still; not in circles nor ellipses, but in looped curves which never return into themselves; as already observed n° 6. Round the paths of Venus and Mercury is marked the graduated circle representing the ecliptic. The dotted lines from the earth to the ecliptic are added for shewing Mercury's apparent geocentric motion therein for one year; in which time his path makes three loops, and goes on a little farther; which shews that he has three inferior, and as many superior, conjunctions with the sun in that time; and also that he is six times stationary, and thrice retrograde. Let us now trace his motion for one year in the figure.

Plate XLIV.
fig. 2.

108
Apparent motions of Mercury and Venus explained.

Suppose Mercury to be setting out from *A* towards *B* (between the earth and left-hand corner of the plate), and as seen from the earth, his motion will then be direct, or according to the order of the signs. But when he comes to *B*, he appears to stand still in the 23^d degree of ♈ at *F*, as shewn by the line *BF*. Whilst he goes from *B* to *C*, the line *BF*, supposed to move with him, goes backward from *F* to *E*, or contrary to the order of signs; and when he is at *C*, he appears stationary at *E*, having gone back 11 $\frac{1}{2}$ degrees. Now, suppose him stationary on the first of January at *C*, on the 10th thereof he will appear in the heavens as at 20, near *F*; on the 20th he will be seen as at *G*; on the 31st, at *H*; on the 10th of February, at *I*; on the 20th, at *K*; and on the 28th, at *L*; as the dotted lines shew, which are drawn through every tenth day's motion in his looped path, and continued to the ecliptic. On the 10th of March he appears at *M*; on the 20th, at *N*; and on

the 31st, at *O*. On the 10th of April he appears stationary at *P*; on the 20th he seems to have gone back again to *O*; and on the 30th he appears stationary at *Q*, having gone back 11 $\frac{1}{2}$ degrees. Thus Mercury seems to go forward 4 signs 11 degrees, or 131 degrees; and to go back only 11 or 12 degrees, at a mean rate. From the 30th of April to the 10th of May he seems to move from *Q* to *R*; and on the 20th he is seen at *S*, going forward in the same manner again, according to the order of letters; and backward when they go back; which it is needless to explain any farther, as the reader can trace him out so easily thro' the rest of the year. The same appearances happen in Venus's motion; but as she moves slower than Mercury, there are longer intervals of time between them. The comets come from all parts of the heavens, and move in all sorts of directions.

The axis of a planet is a line conceived to be drawn through its centre, about which it revolves as if on a real axis. The extremities of this line, terminating in opposite points of the planet's surface, are called its *poles*. That which points towards the northern part of the heavens, is called the *north pole*; and the other, pointing towards the southern part, is called the *south pole*. A bowl whirled from one's hand into the open air turns round such a line within itself, whilst it moves forward; and such are the lines we mean when we speak of the axes of the heavenly bodies.

Let us suppose the earth's orbit to be a thin, even, solid plane; cutting the sun through the centre, and extended out as far as the starry heavens, where it will mark the great circle called the *ecliptic*. This circle we suppose to be divided into 12 equal parts, called *signs*; each sign into 30 equal parts, called *degrees*; each degree into 60 equal parts, called *minutes*; and every minute into 60 equal parts, called *seconds*: so that a second is the 60th part of a minute; a minute the 60th part of a degree; and a degree the 360th part of a circle, or 30th part of a sign. The planes of the orbits of all the other planets likewise cut the sun in halves; but, extended to the heavens, form circles different from one another, and from the ecliptic; one half of each being on the north side, and the other on the south side of it. Consequently the orbit of each planet crosses the ecliptic in two opposite points, which are called the planet's *nodes*. These nodes are all in different parts of the ecliptic; and therefore, if the planetary traicts remained visible in the heavens, they would in some measure resemble the different ruts of waggon-wheels crossing one another in different parts, but never going far asunder. That node, or intersection of the orbit of any planet with the earth's orbit, from which the planet ascends northward above the ecliptic, is called the *ascending node* of the planet; and the other, which is directly opposite thereto, is called its *descending node*. Saturn's ascending node is in 21 deg. 13 min. of Cancer, ☊; Jupiter's in 7 deg. 29 min. of the same sign; Mars's in 17 deg. 17 min. of Taurus,

(☿) Astronomers are not far from the truth, when they reckon the sun's centre to be in the lower focus of all the planetary orbits. Though, strictly speaking, if we consider the focus of Mercury's orbit to be in the sun's centre, the focus of Venus's orbit will be in the common centre of gravity of the sun and Mercury; the focus of the earth's orbit in the common centre of gravity of the sun, Mercury, and Venus; the focus of the orbit of Mars in the common centre of gravity of the sun, Mercury, Venus, and the earth; and so of the rest. Yet, the focuses of the orbits of all the planets, except Saturn, will not be sensibly removed from the centre of the sun; nor will the focus of Saturn's orbit recede sensibly from the common centre of gravity of the sun and Jupiter.

Taurus, γ ; Venus's in 13 deg. 59 min. of Gemini, Π ; and Mercury's in 14 deg. 43 min. of Taurus. Here we consider the earth's orbit as the standard, and the orbits of all the other planets as oblique to it.

When we speak of the planets orbits, all that is meant is their paths through the open and unresisting space in which they move; and are kept in, by the attractive power of the sun, and the projectile force impressed upon them at first; between which power and force there is so exact an adjustment, that they continue in the same traicts without any solid orbits to confine them.

112
Distance of
Mercury from the
sun, his dia-
meter, &c.

Mercury, the nearest planet to the sun, goes round him (as in the circle marked γ) in 87 days 23 hours of our time nearly; which is the length of his year. But being seldom seen, and no spots appearing on his surface or disk, the time of his rotation on his axis, or the length of his days and nights, is as yet unknown. His distance from the sun is computed to be 36,841,448 miles, and his diameter 3000. In his course round the sun, he moves at the rate of 109,699 miles every hour. His light and heat from the sun are almost seven times as great as ours, and the sun appears to him almost seven times as large as to us. The great heat on this planet is no argument against its being inhabited; since the Almighty could as easily suit the bodies and constitutions of its inhabitants to the heat of their dwelling, as he has done to the temperature of our earth. And it is very probable that the people there have such an opinion of us, as we have of the inhabitants of Jupiter and Saturn, namely, that we must be intolerably cold, and have very little light, at so great a distance from the sun.

The orbit of Mercury is inclined seven degrees to the ecliptic; and that node from which he ascends northward above the ecliptic, is in the 14th degree of Taurus; the opposite, in the 14th degree of Scorpio. The earth is in these points on the 6th of November, and 4th of May, new style; and when Mercury comes to either of his nodes at his inferior conjunction (γ) about these times, he will appear to pass over the disk or face of the sun, like a dark round spot. But in all other parts of his orbit his conjunctions are invisible, because he either goes above or below the sun.

113
When to be
seen as a spot
on the sun.

Mr Whiston has given us an account of several periods at which Mercury may be seen on the sun's disk, viz. in the year 1782, Nov. 12th, at 3 h. 44. m. in the afternoon; 1786, May 4th, at 6 h. 57 m. in the forenoon; 1789 Dec. 6th, at 3 h. 55 m. in the afternoon; and 1799, May 7th, at 2 hours 34 m. in the afternoon. There will be several intermediate transits, but none of them visible at London.

114
Distance,
&c. of Ve-
nus.

Venus, the next planet in order, is computed to be 68,891,486 miles from the sun; and by moving at the rate of 80,295 miles every hour in her orbit (as in the circle marked δ), she goes round the sun in 224 days 17 hours of our time nearly; in which, though it be the full length of her year, she has only 9 $\frac{1}{2}$ days according to Bianchini's observations: so that, to her, every day and night together is as long as 24 $\frac{1}{2}$ days and nights with us. This odd quarter of a day in every year makes every fourth year a leap-year to Venus; as the like does to our earth. Her diameter is 9330 miles. Her orbit is included by the earth's: for

if it were not, she might be seen as often in opposition to the sun, as she is in conjunction with him; but she was never seen 90 degrees, or a fourth part of a circle, from the sun.

When Venus appears west of the sun, she rises before him in the morning, and is called the *morning star*; when she appears east of the sun, she shines in the evening after he sets, and is then called the *evening star*; but being each in it's turn for 290 days. It may perhaps be surprising at first, that Venus should keep longer on the east or west of the sun, than the whole time of her period round him. But the difficulty vanishes when we consider that the earth is all the while going round the sun the same way, though not so quick as Venus: and therefore her relative motion to the earth must in every period be as much slower than her absolute motion in her orbit, as the earth during that time advances forward in the ecliptic; which is 220 degrees.

115
Why she
appears so
long on one
side of the
sun.

The axis of Venus is inclined 75 degrees to the axis of her orbit, which is 51 $\frac{1}{2}$ degrees more than our earth's axis is inclined to the axis of the ecliptic; and therefore her seasons vary much more than ours do. The north pole of her axis inclines toward the 20th degree of Aquarius, our earth's to the beginning of Cancer: consequently the northern parts of Venus have summer in the signs where those of our earth have winter, and *vice versa*.

The artificial day at each pole of Venus is as long as 112 $\frac{1}{2}$ natural days on our earth.

The sun's greatest declination on each side of her equator amounts to 75 degrees; therefore her tropics are only 15 degrees from her poles, and her polar circles as far from her equator. Consequently, the tropics of Venus are between her polar circles and her poles; contrary to what those of our earth are.

116
Great decli-
nation of the
sun as ob-
served from
Venus.

As her annual revolution contains only 9 $\frac{1}{2}$ of her days, the sun will always appear to go through a whole sign, or twelfth part of her orbit, in little more than three quarters of her natural day, or nearly in 18 $\frac{1}{2}$ of our days and nights.

Because her day is so great a part of her year, the sun changes his declination in one day so much, that if he passes vertically, or directly over head of any given place on the tropic, the next day he will be 26 degrees from it; and whatever place he passes vertically over when in the equator, one day's revolution will remove him 36 $\frac{1}{2}$ degrees from it. So that the sun changes his declination every day in Venus about 14 degrees more, at a mean rate, than he does in a quarter of a year on our earth. This appears to be providentially ordered, for preventing the too great effects of the sun's heat (which is twice as great on Venus as on the earth), so that he cannot shine perpendicularly on the same places for two days together; and on that account, the heated places have time to cool.

If the inhabitants about the north pole of Venus fix their foot, or meridian line, through that part of the heavens where the sun comes to his greatest height, or north declination, and call those the east and west points of their horizon, which are 90 degrees on each side from that point where the horizon is cut by the meridian line, these inhabitants will have the following remarkable appearances:

117
Remarkable
appearances
to her inha-
bitants.

5 F 2

The

(γ) When he is between the earth and the sun in the nearer part of his orbit.

The sun will rise $22\frac{1}{2}$ degrees north of the east; and going on $112\frac{1}{2}$ degrees, as measured on the plane of the horizon, he will cross the meridian at an altitude of $12\frac{1}{2}$ degrees: then, making an entire revolution without setting, he will cross it again at an altitude of $48\frac{1}{2}$ degrees: at the next revolution he will cross the meridian, as he comes to his greatest height and declination, at the altitude of 75 degrees; being then only 15 degrees from the zenith, or that point of the heavens which is directly over head: and thence he will descend in the like spiral manner; crossing the meridian first at the altitude of $48\frac{1}{2}$ degrees, next at the altitude of $12\frac{1}{2}$ degrees; and going on thence $112\frac{1}{2}$ degrees, he will set $22\frac{1}{2}$ degrees north of the west; so that, after having been $4\frac{1}{2}$ revolutions above the horizon, he descends below it to exhibit the like appearances at the fourth pole.

At each pole, the sun continues half a year without setting in summer, and as long without rising in winter; consequently the polar inhabitants of Venus have only one day and one night in the year; as it is at the poles of our earth. But the difference between the heat of summer and cold of winter, or of mid-day and mid-night, on Venus, is much greater than on the earth: because on Venus, as the sun is for half a year together above the horizon of each pole in its turn, so he is for a considerable part of that time near the zenith; and during the other half of the year always below the horizon, and for a great part of that time at least 70 degrees from it. Whereas, at the poles of our earth, although the sun is for half a year together above the horizon; yet he never ascends above, nor descends below it, more than $23\frac{1}{2}$ degrees. When the sun is in the equinoctial, or in that circle which divides the northern half of the heavens from the southern, he is seen with one half of his disk above the horizon of the north-pole, and the other half above the horizon of the south-pole; so that his centre is in the horizon of both poles: and then, descending below the horizon of one, he ascends gradually above that of the other. Hence, in a year, each pole has one spring, one harvest, a summer as long as them both, and a winter equal in length to the other three seasons.

At the polar circles of Venus, the seasons are much the same as at the equator, because there are only 15 degrees between them; only the winters are not quite so long, nor the summers so short; but the four seasons come twice round every year.

At Venus's tropics, the sun continues for about 15 of our weeks together without setting in summer, and as long without rising in winter. Whilst he is more than 15 degrees from the equator, he neither rises to the inhabitants of the one tropic, nor sets to those of the other; whereas, at our terrestrial tropics, he rises and sets every day of the year.

At Venus's tropics, the seasons are much the same as at her poles; only the summers are a little longer, and the winters a little shorter.

At her equator, the days and nights are always of the same length; and yet the diurnal and nocturnal arches are very different, especially when the sun's declination is about the greatest: for then, his meridian altitude may sometimes be twice as great as his midnight depression, and at other times the reverse. When the sun is at his greatest declination, either north or south,

his rays are as oblique at Venus's equator, as they are at London on the shortest day of winter. Therefore, at her equator, there are two winters, two summers, two springs, and two autumns, every year. But because the sun stays for some time near the tropics, and passes so quickly over the equator, every winter there will be almost twice as long as summer; the four seasons returning twice in that time, which consists only of $9\frac{1}{2}$ days.

Those parts of Venus which lie between the poles and tropics, and between the tropics and polar circles, and also between the polar circles and equator, partake more or less of the phenomena of these circles, as they are more or less distant from them.

From the quick change of the sun's declination it happens, that if he rises due east on any day, he will not set due west on that day, as with us; for if the place where he rises due east be on the equator, he will set on that day almost west north-west, or about $18\frac{1}{2}$ degrees north of the west. But if the place be in 45 degrees north latitude, then on the day that the sun rises due east he will set north-west by west, or 33 degrees north of the west. And in 62 degrees north latitude, when he rises in the east, he sets not in that revolution, but just touches the horizon 10 degrees to the west of the north point; and ascends again, continuing for $3\frac{1}{2}$ revolutions above the horizon without setting. Therefore no place has the forenoon and afternoon of the same day equally long, unless it be on the equator, or at the poles.

The sun's altitude at noon, or any other time of the day, and his amplitude at rising and setting, being very different at places on the same parallel of latitude, according to the different longitudes of those places, the longitude will be almost as easily found on Venus, as the latitude is found on the earth: which is an advantage we can never have, because the daily change of the sun's declination is much too small for that important purpose.

On this planet, where the sun crosses the equator in any year, he will have 9 degrees of declination from that place on the same day and hour next year; and will cross the equator 90 degrees farther to the west; which makes the time of the equinox a quarter of a day (or about six of our days) later every year. Hence although the spiral in which the sun's motion is performed be of the same sort every year, yet it will not be the very same, because the sun will not pass vertically over the same places till four annual revolutions are finished.

We may suppose that the inhabitants of Venus will be careful to add a day to some particular part of every fourth year; which will keep the same seasons to the same days. For, as the great annual change of the equinoxes and solstices shifts the seasons a quarter of a day every year, they would be shifted through all the days of the year in 36 years. But by means of this intercalary day, every fourth year will be a leap-year: which will bring her time to an even reckoning, and keep her calendar always right.

At the transits of Venus over the sun in 1761 and 1769, astronomers were very careful to observe whether any satellite belonging to this planet could be discovered; but as none was to be seen, it is now generally concluded that she has none, but that Cassini and Mr Short were mistaken.

118
Great difference between the heat of summer and cold of winter.

119
Longitude of places in Venus easily found.

120
Every fourth year a leap-year.

121
Has no satellite.

122
Distance,
&c. of the
earth.

The earth is the next planet above Venus in the system. It is 95,173,000 miles from the sun, and goes round him (as in the circle \odot) in 365 days 5 hours 49 minutes, from any equinox or solstice to the same again; but from any fixed star to the same again as seen from the sun, in 365 days 6 hours 9 minutes; the former being the length of the tropical year, and the latter the length of the sidereal. It travels at the rate of 68,000 miles every hour; which motion, tho' composed of 140 times swifter than that of a cannon ball, is little more than half as swift as Mercury's motion in his orbit. The earth's diameter is 7970 miles; and by turning round its axis every 24 hours from west to east, it causes an apparent diurnal motion of all the heavenly bodies from east to west. By this rapid motion of the earth on its axis, the inhabitants about the equator are carried 1042 miles every hour, whilst those on the parallel of London are carried only about 580, besides the 68,000 miles by the annual motion above-mentioned, which is common to all places whatever.

The earth's axis makes an angle of $23\frac{1}{2}$ degrees with the axis of its orbit, and keeps always the same oblique direction, inclining nearly to the same fixed stars (\odot) throughout its annual course, which causes the returns of spring, summer, autumn, and winter. That the sun, and not the earth, is the centre of our solar system, may be demonstrated beyond a possibility of doubt, from considering the forces of gravitation and projection, by which all the celestial bodies are retained in their orbits. For, if the sun moves about the earth, the earth's attractive power must draw the sun towards it from the line of projection so, as to bend its motion into a curve. But the sun being at least 227,000 times as heavy as the earth, by being so much weightier as its quantity of matter is greater, it must move 227,000 times as slowly toward the earth, as the earth does toward the sun; and consequently the earth would fall to the sun in a short time, if it had not a very strong projectile motion to carry it off. The earth therefore, as well as every other planet in the system, must have a rectilinear impulse, to prevent its falling into the sun. To say, that gravitation retains all the other planets in their orbits without affecting the earth, which is placed between the orbits of Mars and Venus, is as absurd as to suppose that six cannon-bullets might be projected upwards to different heights in the air, and that five of them should fall down to the ground; but the sixth, which is neither the highest nor the lowest, should remain suspended in the air without falling, and the earth move round about it.

There is no such thing in nature as a heavy body moving round a light one as its centre of motion. A pebble fastened to a mill-stone by a string, may by an easy impulse be made to circulate round the mill-stone: but no impulse can make a mill-stone circulate round a loose pebble; for the mill-stone would go off, and carry the pebble along with it.

The sun is so immensely bigger and heavier than the earth, that, if he was moved out of his place, not only the earth, but all the other planets, if they were united into one mass, would be carried along with the sun,

as the pebble would be with the mill-stone.

By considering the law of gravitation, which takes place throughout the solar system, in another light, it will be evident that the earth moves round the sun in a year, and not the sun round the earth. It has been observed, that the power of gravity decreases as the square of the distance increases; and from this it follows with mathematical certainty, that when two or more bodies move round another as their centre of motion, the squares of their periodic times will be to one another in the same proportion, as the cubes of their distances from the central body. This holds precisely with regard to the planets round the sun, and the satellites round the planets; the relative distances of all which are well known. But, if we suppose the sun to move round the earth, and compare its period with the moon's by the above rule, it will be found that the sun would take no less than 173,510 days to move round the earth; in which case our year would be 475 times as long as it now is. To this we may add, that the aspects of increase and decrease of the planets, the times of their seeming to stand still, and to move direct and retrograde, answer precisely to the earth's motion; but not at all to the sun's, without introducing the most absurd and monstrous suppositions, which would destroy all harmony, order, and simplicity, in the system. Moreover, if the earth be supposed to stand still, and the stars to revolve in free spaces about the earth in 24 hours, it is certain that the forces by which the stars revolve in their orbits are not directed to the earth, but to the centres of the several orbits; that is, of the several parallel circles which the stars on different sides of the equator describe every day: and the like inferences may be drawn from the supposed diurnal motion of the planets, since they are never in the equinoctial but twice, in their courses with regard to the starry heavens. But that forces should be directed to no central body, on which they physically depend, but to innumerable imaginary points in the axis of the earth produced to the poles of the heavens, is an hypothesis too absurd to be allowed of by any rational creature. And it is still more absurd to imagine that these forces should increase exactly in proportion to the distances from this axis; for this is an indication of an increase to infinity; whereas the force of attraction is found to decrease in receding from the fountain from whence it flows. But the farther any star is from the quiescent pole, the greater must be the orbit which it describes; and yet it appears to go round in the same time as the nearest star to the pole does. And if we take into consideration the twofold motion observed in the stars, one diurnal round the axis of the earth in 24 hours, and the other round the axis of the ecliptic in 25,920 years, it would require an explication of such a perplexed composition of forces, as could by no means be reconciled with any physical theory.

The strongest objection that can be made against the earth's motion round the sun, is, that in opposite points of the earth's orbit, its axis, which always keeps a parallel direction, would point to different fixed stars; which is not found to be fact. But this objection is easily removed, by considering the immense distance

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From the
proportion-
al decrease
of gravity,
&c.

123
Demonstration
of the earth's mo-
tion,

125
Objection
against the
earth's mo-
tion answer-
ed.

(c) This is not strictly true, as will appear when we come to treat of the recession of the equinoctial points in the heavens, which recession is equal to the deviation of the earth's axis from its parallelism: but this is rather too small to be sensible in an age, except to those who make very nice observations.

distance of the stars in respect of the diameter of the earth's orbit; the latter being no more than a point when compared to the former. If we lay a ruler on the side of a table, and along the edge of the ruler view the top of a spire at ten miles distance; then lay the ruler on the opposite of the table in a parallel situation to what it had before, and the spire will still appear along the edge of the ruler; because our eyes, even when assisted by the best instruments, are incapable of distinguishing so small a change at so great a distance.

226
Earth's motion demonstrated from the aberration of light.

5th Plate
XLII.

Dr Bradley, our late astronomer royal, found by a long series of the most accurate observations, that there is a small apparent motion of the fixed stars, occasioned by the aberration of their light; and so exactly answering to an annual motion of the earth, as evinces the same, even to a mathematical demonstration. He considered this matter in the following manner: he imagined CA, fig. 5. to be a ray of light falling perpendicularly upon the line BD; that, if the eye is at rest at A, the object must appear in the direction AC, whether light be propagated in time or in an instant. But if the eye is moving from B towards A, and light is propagated in time, with a velocity that is to the velocity of the eye, as CA to BA; then light moving from C to A, whilst the eye moves from B to A, that particle of it by which the object will be discerned when the eye comes to A, is at C when the eye is at B. Joining the points BC, he supposed the line CB to be a tube, inclined to the line BD in the angle DBC, of such diameter as to admit but one particle of light. Then it was easy to conceive, that the particle of light at C, by which the object must be seen, when the eye, as it moves along, arrives at A, would pass through the tube BC, if it is inclined to BD in the angle DBC, and accompanies the eye in its motion from B to A; and that it could not come to the eye placed behind such a tube, if it had any other inclination to the line BD. If, instead of supposing CB so small a tube, we imagine it to be the axis of a larger; then, for the same reason, the particle of light at C would not pass through the axis, unless it is inclined to BD in the angle CBD. In like manner, if the eye moved the contrary way, from D towards A, with the same velocity, then the tube must be inclined in the angle BDC. Although, therefore, the true or real place of an object is perpendicular to the line in which the eye is moving, yet the visible place will not be so; since that, no doubt, must be in the direction of the tube; but the difference between the true and apparent place will be, *ceteris paribus*, greater or less, according to the different proportion between the velocity of light and that of the eye. So that, if we could suppose that light was propagated in an instant, then there would be no difference between the real and visible place of an object, although the eye was in motion; for in that case, AC being infinite with respect to AB, the angle ACB, the difference between the true and visible place, vanishes. But if light be propagated in time, it is evi-

dent, from the foregoing considerations, that there will be always a difference between the real and visible place of an object, unless the eye is moving either directly towards or from the object. And in all cases the sine of the difference between the real and visible place of the object will be to the sine of the visible inclination of the object to the line in which the eye is moving, as the velocity of the eye is to the velocity of light.

He then shews, that if the earth revolve round the sun annually, and the velocity of light be to the velocity of the earth's motion in its orbit, as 1000 to 1, that a star really placed in the very pole of the ecliptic would, to an eye carried along with the earth, seem to change its place continually; and, neglecting the small difference on the account of the earth's diurnal revolution on its axis, would seem to describe a circle round that pole every way distant from it $3\frac{1}{2}$; so that its longitude would be varied thro' all the points of the ecliptic every year, but its latitude would always remain the same. Its right ascension would also change, and its declination, according to the different situation of the sun with respect to the equinoctial points, and its apparent distance from the north pole of the equator, would be 7' less at the autumnal than at the vernal equinox.

By calculating exactly the quantity of aberration of the fixed stars from their place, he found that light came from the sun to us in 8'-13"; so that its velocity is to the velocity of the earth in its orbit, as 10,201 to 1.

It must here be taken notice of, however, that Mr Nevil Maskelyne, in attempting to find the parallax of Sirius with a ten-foot sector, observed, that by the friction of the plummet line on the pin which suspended it, an error of 10", 20", and sometimes 30", was committed. The pin was $\frac{1}{16}$ of an inch diameter; and though he reduced it to $\frac{1}{16}$ of an inch, the error still amounted to 3". All observations, therefore, that have hitherto been made in order to discover the parallax of the fixed stars, are to be disregarded; and even the quantity of aberration assigned by Dr Bradley to the fixed stars is to be doubted.

It is also objected, that the sun seems to change his place daily, so as to make a tour round the starry heavens in a year. But, whether the sun or earth moves, this appearance will be the same; for, when the earth is in any part of the heavens, the sun will appear in the opposite. And therefore, this appearance can be no objection against the motion of the earth.

It is well known to every person who has sailed on smooth water, or been carried by a stream in a calm, that, however fast the vessel goes, he does not feel its progressive motion. The motion of the earth is incomparably more smooth and uniform than that of a ship, or any machine made and moved by human art; and therefore it is not to be imagined that we can feel its motion.

We find that the sun, and those planets on which there are visible spots, turn round their axes: for the spots move regularly over their disks (σ). From hence we

(c) This, however, must be understood with some degree of limitation, as will evidently appear from what has been said concerning the spots of the sun. Nay, even in the planet Jupiter, whose rotation on his axis seems better ascertained than that of any other, the difference of time between the revolution of the spots about his equator, and those near his poles, is a phenomenon that hath puzzled the best astronomers. Mr M'Laure (Phys. and Literary Essays, Vol. I. p. 206.) says, that it is "a phenomenon of that kind of which it is perhaps best not to attempt any explanation till confirmed by further experiments." Since his time it has been confirmed, but we have not heard of any satisfactory explanation.

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Velocity of light.

118
Errors in the observation of fixed stars.

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Another objection against the earth's motion answered.

we may reasonably conclude, that the other planets on which we see no spots, and the earth, which is likewise a planet, have such rotations. But being incapable of leaving the earth, and viewing it at a distance, and its rotation being smooth and uniform, we can neither see it move on its axis as we do the planets, nor feel ourselves affected by its motion. Yet there is one effect of such a motion, which will enable us to judge with certainty whether the earth revolves on its axis or not. All globes which do not turn round their axes will be perfect spheres, on account of the equality of the weight of bodies on their surfaces; especially of the fluid parts. But all globes which turn on their axes will be oblate spheroids; that is, their surfaces will be higher, or farther from the centre, in the equatorial than in the polar regions: for, as the equatorial parts move quickest, they will recede farthest from the axis of motion, and enlarge the equatorial diameter. That our earth is really of this figure, is demonstrable from the unequal vibrations of a pendulum, and the unequal lengths of degrees in different latitudes. Since then the earth is higher at the equator than at the poles, the sea, which naturally runs downward, or towards the places which are nearest the centre, would run towards the polar regions, and leave the equatorial parts dry, if the centrifugal force of these parts, by which the waters were carried thither, did not keep them from returning. The earth's equatorial diameter is 36 miles longer than its axis.

Bodies near the poles are heavier than those towards the equator, because they are nearer the earth's centre, where the whole force of the earth's attraction is accumulated. They are also heavier, because their centrifugal force is less, on account of their diurnal motion being slower. For both these reasons, bodies carried from the poles toward the equator gradually lose their weight. Experiments prove, that a pendulum, which vibrates seconds near the poles vibrates slower near the equator, which shews that it is lighter or less attracted there. To make it oscillate in the same time, it is found necessary to diminish its length. By comparing the different lengths of pendulums swinging seconds at the equator and at London, it is found that a pendulum must be $2\frac{1}{1000}$ lines shorter at the equator than at the poles. A line is a twelfth part of an inch.

If the earth turned round its axis in 84 minutes 43 seconds, the centrifugal force would be equal to the power of gravity at the equator; and all bodies there would entirely lose their weight. If the earth revolved quicker, they would all fly off, and leave it.

A person on the earth can no more be sensible of its undisturbed motion on its axis, than one in the cabin of a ship on smooth water can be sensible of the ship's motion when it turns gently and uniformly round. It is therefore no argument against the earth's diurnal motion, that we do not feel it: nor is the apparent revolutions of the celestial bodies every day a proof of the reality of these motions; for whether we or they revolve, the appearance is the very same. A person, looking through the cabin-windows of a ship, as strongly fancies the objects on land to go round when the ship turns, as if they were actually in motion.

If we could translate ourselves from planet to planet,

we should still find that the stars would appear of the same magnitudes, and at the same distances from each other, as they do to us here; because the width of the remotest planet's orbit bears no sensible proportion to the distance of the stars. But then, the heavens would seem to revolve about very different axes; and consequently, those quiescent points, which are our poles in the heavens, would seem to revolve about other points, which, though apparently in motion as seen from the earth, would be at rest as seen from any other planet. Thus the axis of Venus, which lies at right angles to the axis of the earth, would have its motionless poles in two opposite points of the heavens lying almost in our equinoctial, where the motion appears quickest, because it is seemingly performed in the greatest circle: and the very poles, which are at rest to us, have the quickest motion of all as seen from Venus. To Mars and Jupiter the heavens appear to turn round with very different velocities on the same axis, whose poles are about $23\frac{1}{2}$ degrees from ours. Were we on Jupiter, we should be at first amazed at the rapid motion of the heavens; the sun and stars going round in 9 hours 56 minutes. Could we go from thence to Venus, we should be as much surprised at the slowness of the heavenly motions; the sun going but once round in 584 hours, and the stars in 540. And could we go from Venus to the moon, we should see the heavens turn round with a yet slower motion; the sun in 708 hours, the stars in 655. As it is impossible these various circumvolutions in such different times, and on such different axes, can be real, so it is unreasonable to suppose the heavens to revolve about our earth more than it does about any other planet. When we reflect on the vast distance of the fixed stars, to which 190,000,000 of miles, the diameter of the earth's orbit, is but a point, we are filled with amazement at the immensity of their distance. But if we try to frame an idea of the extreme rapidity with which the stars must move, if they move round the earth in 24 hours, the thought becomes so much too big for our imagination, that we can no more conceive it than we do infinity or eternity. If the sun was to go round the earth in 24 hours, he must travel upwards of 300,000 miles in a minute: but the stars being at least 400,000 times as far from the sun, as the sun is from us, those about the equator must move 400,000 times as quick. And all this to serve no other purpose than what can be as fully and much more simply obtained by the earth's turning round eastward, as on an axis, every 24 hours, causing thereby an apparent diurnal motion of the sun westward, and bringing about the alternate returns of day and night.

As to the common objections against the earth's motion on its axis, they are all easily answered and set aside. That it may turn without being seen or felt by us to do so, has been already shewn. But some are apt to imagine, that if the earth turns eastward (as it certainly does if it turns at all), a ball fired perpendicularly upward in the air must fall considerably westward of the place it was projected from. The objection, which at first seems to have some weight, will be found to have none at all, when we consider that the gun and ball partake of the earth's motion; and therefore the ball being carried forward with the air as quick as the earth and air turn, must fall down on the same place. A stone let fall from the top of a main-

Earth's motion proved from the celestial appearances from different planets.

Another objection answered.

Argument for the earth's motion from its spheroidal figure.

Weight of bodies increases towards the poles.

maft, if it meets with no obftacle, falls on the deck as near the foot of the maft when the fhip fails as when it does not. If an inverted bottle, full of liquor, be hung up to the ceiling of the cabin, and a fmall hole be made in the cork to let the liquor drop through on the floor, the drops will fall juft as far forward on the floor when the fhip fails as when it is at reft. And gnats or flies can as eafily dance among one another in a moving cabin as in a fixed chamber. As for thofe fcripture expreffions which feem to contradict the earth's motion, this general anfwer may be made to them all, *viz.* It is plain from many inftances, that the Scriptures were never intended to inftitute us in philofophy or aftronomy; and therefore on thofe fubjects expreffions are not always to be taken in the literal fenfe, but for the moft part as accommodated to the common apprehenfions of mankind. Men of fenfe in all ages, when not treating of the fciences purpofely, have followed this method: and it would be in vain to follow any other in addreffing ourfelves to the vulgar, or bulk of any community.

The following experiment will give a plain idea of the diurnal and annual motions of the earth, together with the different lengths of days and nights, and all the beautiful variety of feafons, depending on thofe motions.

Take about feven feet of ftrong wire, and bend it into a circular form, as a bcd, which being viewed obliquely, appears elliptical, as in the figure. Place a lighted candle on a table; and having fixed one end of a filk thread K, to the north pole of a fmall terreftrial globe H, about three inches diameter, caufe another perfon to hold the wire circle, fo that it may be parallel to the table, and as high as the flame of the candle I, which fhould be in or near the centre. Then having twifted the thread as towards the left hand, that by untwifting it may turn the globe round eafterward, or contrary to the way that the hands of a watch move, hang the globe by the thread within this circle, almoft contiguous to it; and as the thread untwifts, the globe (which is enlightened half round by the candle as the earth is by the fun) will turn round its axis, and the different places upon it will be carried through the light and dark hemifpheres, and have the appearance of a regular fucceffion of days and nights, as our earth has in reality by fuch a motion. As the globe turns, move your hand slowly, fo as to carry the globe round the candle according to the order of the letters a b c d, keeping its centre even with the wire circle; and you will perceive, that the candle, being ftill perpendicular to the equator, will enlighten the globe from pole to pole in its whole motion round the circle; and that every place on the globe goes equally through the light and the dark, as it turns round by the untwisting of the thread, and therefore has a perpetual equinox. The globe thus turning round represents the earth turning round its axis; and the motion of the globe round the candle represents the earth's annual motion round the fun; and fhews, that if the earth's orbit had no inclination to its axis, all the days and nights of the year would be equally long, and there would be no different feafons. Hence alfo it appears why the planets Mars and Jupiter have a perpetual equinox, namely, becaufe their axis is perpendicular to the plane of their orbit, as the thread round which the

globe turns in this experiment is perpendicular to the plane of the area inclofed by the wire.—But now defire the perfon who holds the wire to hold it obliquely in the pofition ABCD, raifing the fide ∞ juft as much as he deprefles the fide $\gamma\delta$, that the flame may be ftill in the plane of the circle; and twifting the thread as before, that the globe may turn round its axis the fame way as you carry it round the candle; that is, from weft to eaft; let the globe down into the lowermoft part of the wire circle at $\gamma\delta$; and if the circle be properly inclined, the candle will fhine perpendicularly on the tropic of Cancer; and the frigid zone, lying within the arctic or north polar circle, will be all in the light, as in the figure; and will keep in the light let the globe turn round its axis ever fo often. From the equator to the north polar circle, all the places have longer days and shorter nights; but from the equator to the fouth polar circle, juft the reverfe. The fun does not fet to any part of the north frigid zone, as fhewn by the candle's fhining on it, fo that the motion of the globe can carry no place of that zone into the dark; and at the fame time the fouth frigid zone is involved in darknefs, and the turning of the globe brings none of its places into the light. If the earth were to continue in the like part of its orbit, the fun would never fet to the inhabitants of the north frigid zone, nor rife to thofe of the fouth. At the equator, it would be always equal day and night; and as places are gradually more and more diftant from the equator towards the arctic circle, they would have longer days and shorter nights; whilft thofe on the fouth fide of the equator would have their nights longer than their days. In this cafe, there would be continual fummer on the north fide of the equator, and continual winter on the fouth fide of it.

But as the globe turns round its axis, move your hand flowly forward, fo as to carry the globe from H towards E, and the boundary of light and darknefs will approach towards the north pole, and recede towards the fouth pole; the northern places will go through lefs and lefs of the light, and the fouthern places through more and more of it; fhewing how the northern days decrease in length, and the fouthern days increafe, whilft the globe proceeds from H to E. When the globe is at E, it is at a mean ftate between the loweft and higheft parts of its orbit; the candle is directly over the equator, the boundary of light and darknefs juft reaches to both the poles, and all places on the globe go equally through the light and dark hemifpheres, fhewing that the days and nights are then equal at all places of the earth, the poles only excepted; for the fun is then fetting to the north pole, and rifing to the fouth pole.

Continue moving the globe forward, and as it goes through the quarter A, the north pole recedes ftill farther into the dark hemifphere, and the fouth pole advances more into the light, as the globe comes nearer to ∞ ; and when it comes there at F, the candle is directly over the tropic of Capricorn; the days are at the fhorteft, and nights at the longeft, in the northern hemifphere, all the way from the equator to the arctic circle; and the reverfe in the fouthern hemifphere from the equator to the antarctic circle; within which circles it is dark to the north frigid zone, and light to the fouth.

Continue

Continue both motions; and as the globe moves through the quarter B, the north pole advances towards the light, and the south pole recedes towards the dark; the days lengthen in the northern hemisphere, and shorten in the southern; and when the globe comes to G, the candle will be again over the equator (as when the globe was at E), and the days and nights will again be equal as formerly: and the north pole will be just coming into the light, the south pole going out of it.

Thus we see the reason why the days lengthen and shorten from the equator to the polar circles every year; why there is sometimes no day or night for many turnings of the earth, within the polar circles; why there is but one day and one night in the whole year at the poles; and why the days and nights are equally long all the year round at the equator, which is always equally cut by the circle bounding light and darkness.

The inclination of an axis or orbit is merely relative, because we compare it with some other axis or orbit which we consider as not inclined at all. Thus, our horizon being level to us, whatever place of the earth we are upon, we consider it as having no inclination; and yet, if we travel 90 degrees from that place, we shall then have an horizon perpendicular to the former; but it will still be level to us.

Let us now take a view of the earth in its annual course round the sun, considering its orbit as having no inclination; and its axis as inclining $23\frac{1}{2}$ degrees from a line perpendicular to the plane of its orbit, and keeping the same oblique direction in all parts of its annual course; or, as commonly termed, keeping always parallel to itself.

Let a, b, c, d, e, f, g, h be the earth in eight different parts of its orbit, equidistant from one another; N , its axis, N its north pole, s its south pole, and S the sun nearly in the centre of the earth's orbit. As the earth goes round the sun according to the order of the letters $abcd$, &c. its axis N keeps the same obliquity, and is still parallel to the line MN . When the earth is at a , its north pole inclines towards the sun S , and brings all the northern places more into the light than at any other time of the year. But when the earth is at e in the opposite time of the year, the north pole declines from the sun, which occasions the northern places to be more in the dark than in the light, and the reverse at the southern places; as is evident by the figure, which is taken from Dr Long's astronomy. When the earth is either at c or g , its axis inclines not either to or from the sun, but lies sidewise to him, and then the poles are in the boundary of light and darkness; and the sun, being directly over the equator, makes equal day and night at all places. When the earth is at b , it is half-way between the summer solstice and harvest equinox; when it is at d , it is half-way from the harvest equinox to the winter solstice; at f , half-way from the winter solstice to the spring equinox; and at h , half-way from the spring equinox to the summer solstice.

From this oblique view of the earth's orbit, let us suppose ourselves to be raised far above it, and placed just over its centre S , looking down upon it from its north pole; and as the earth's orbit differs but very little from a circle, we shall have its figure in such a

view represented by the circle $ABCDEFGHIH$. Let us suppose this circle to be divided into 12 equal parts, as *figs.* having their names affixed to them; and each sign into 30 equal parts, called *degrees*, numbered 10, 20, 30, as in the outermost circle of the figure, which represents the great ecliptic in the heavens. The earth is shewn in eight different positions in this circle; and in each position E is the equator, T the tropic of Cancer, the dotted circle the parallel of London, U the arctic or north polar circle, and P the north pole, where all the meridians or hour-circles meet. As the earth goes round the sun, the north pole keeps constantly towards one part of the heavens, as it keeps in the figure towards the right-hand side of the plate.

When the earth is at the beginning of Libra, namely on the 20th of March, in this figure the sun S as seen from the earth appears at the beginning of Aries in the opposite part of the heavens, the north pole is just coming into the light, and the sun is vertical to the equator; which together with the tropic of Cancer, parallel of London, and arctic circle, are all equally cut by the circle bounding light and darkness, coinciding with the six-o'clock hour-circle, and therefore the days and nights are equally long at all places: for every part of the meridian $ETLa$ comes into the light at six in the morning, and, revolving with the earth according to the order of the hour-letters, goes into the dark at six in the evening. There are 24 meridians or hour-circles drawn on the earth in this figure, to shew the time of sun-rising and setting at different seasons of the year.

As the earth moves in the ecliptic according to the order of the letters $ABCD$, &c. through the signs Libra, Scorpio, and Sagittarius, the north pole P comes more and more into the light; the days increase as the nights decrease in length, at all places north of the equator E ; which is plain by viewing the earth at b on the 5th of May, when it is in the 15th degree of Scorpio, and the sun as seen from the earth appears in the 15th degree of Taurus. For then the tropic of Cancer T is in the light from a little after five in the morning till almost seven in the evening; the parallel of London, from half an hour past four till half an hour past seven; the polar circle U , from three till nine; and a large track round the north pole P has day all the 24 hours, for many rotations of the earth on its axis.

When the earth comes to c (Pl. XLV. fig. 4.) at the beginning of Capricorn, and the sun as seen from the earth appears at the beginning of Cancer, on the 21st of June, as in this figure, it is in the position C in fig. 1.; Pl. XLVI. and its north pole inclines towards the sun, so as to bring all the north frigid zone into the light, and the northern parallels of latitude more into the light than the dark from the equator to the polar circle; and the more so as they are farther from the equator. The tropic of Cancer is in the light from five in the morning till seven at night, the parallel of London from a quarter before four till a quarter after eight; and the polar circle just touches the dark, so that the sun has only the lower half of his disk hid from the inhabitants on that circle for a few minutes about midnight, supposing no inequalities in the horizon, and no refractions.

A bare view of the figure is enough to shew, that as the earth advances from Capricorn towards Aries, and

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Different
seasons par-
ticularly ex-
plained.

Plate XLV.
fig. 4.

the sun appears to move from Cancer towards Libra, the north pole recedes from the light, which causes the days to decrease, and the nights to increase in length, till the earth comes to the beginning of Aries, and then they are equal as before; for the boundary of light and darkness cuts the equator and all its parallels equally, or in halves. The north pole then goes into the dark, and continues therein until the earth goes half-way round its orbit; or, from the 23^d of September till the 20th of March. In the middle between these times, *viz.* on the 22^d of December, the north pole is as far as it can be in the dark, which is $23\frac{1}{2}$ degrees, equal to the inclination of the earth's axis from a perpendicular to its orbit: and then the northern parallels are as much in the dark as they were in the light on the 21st of June; the winter nights being as long as the summer days, and the winter days as short as the summer nights. Here it must be noted, that of all that has been said of the northern hemisphere, the contrary must be understood of the southern; for on different sides of the equator the seasons are contrary, because, when the northern hemisphere inclines towards the sun, the southern declines from him.

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Why the
sun appears
bigger in
winter than
in summer.

The earth's orbit being elliptical, and the sun constantly keeping in its lower focus, which is 1,617,941 miles from the middle point of the longer axis, the earth comes twice so much, or 3,235,882 miles, nearer the sun at one time of the year than at another; for the sun appearing under a larger angle in our winter than summer, proves that the earth is nearer the sun in winter (1). But here this natural question will arise, Why have we not the hottest weather when the earth is nearest the sun? In answer it must be observed, that the eccentricity of the earth's orbit, or 1,617,941 miles, bears no greater proportion to the earth's mean distance from the sun than 17 does to 1000; and therefore, this small difference of distance cannot occasion any great difference of heat or cold. But the principal cause of this difference is, that in winter the sun's rays fall so obliquely upon us, that any given number of them is spread over a much greater portion of the earth's surface where we live; and therefore each point must then have fewer rays than in summer. Moreover, there comes a greater degree of cold in the long winter-nights, than there can return of heat in so short days; and on both these accounts the cold must increase. But in summer the sun's rays fall more perpendicularly upon us; and therefore come with greater force, and in greater numbers, on the same place; and by their long continuance, a much greater degree of heat is imparted by day than can fly off by night. Besides, those parts which are once heated, retain the heat for some time; which, with the additional heat daily imparted, makes it continue to increase, though the sun declines towards the south: and this is the reason why July is hotter than June, although the sun has withdrawn from the summer tropic; as we find it is generally hotter at three in the afternoon, when the sun has gone towards the west, than at noon when he is on the meridian. Likewise those places which are well cooled require time to be heated again; for the sun's rays do not heat even the surface of any body till they have

been some time upon it. And therefore we find January for the most part colder than December, altho' the sun has withdrawn from the winter tropic, and begins to dart his beams more perpendicularly upon us. An iron bar is not heated immediately upon being in the fire, nor grows cold till some time after it has been taken out.

It has been already observed, that by the earth's motion on it's axis, there is more matter accumulated all around the equatorial parts than any where else on the earth.

The sun and moon, by attracting this redundancy of matter, bring the equator sooner under them in every return towards it, than if there was no such accumulation. Therefore, if the sun sets out, as from any star, or other fixed point in the heavens, the moment when he is departing from the equinoctial or from either tropic, he will come to the same equinox or tropic again 20 min. $17\frac{1}{2}$ sec. of time, or 50 seconds of a degree, before he completes his course, so as to arrive at the same fixed star or point from whence he set out. For the equinoctial points recede 50 seconds of a degree westward every year, contrary to the sun's annual progressive motion.

When the sun arrives at the same equinoctial or solstitial point, he finishes what we call the *Tropical Year*; which, by observation, is found to contain 365 days 5 hours 48 minutes 57 seconds: and when he arrives at the same fixed star again, as seen from the earth, he completes the sidereal year, which contains 365 days 6 hours 9 minutes $14\frac{1}{2}$ seconds. The sidereal year is therefore 20 minutes $17\frac{1}{2}$ seconds longer than the solar or tropical year, and 9 minutes $14\frac{1}{2}$ seconds longer than the Julian or the civil year, which we state at 365 days 6 hours, so that the civil year is almost a mean between the sidereal and tropical.

As the sun describes the whole ecliptic, or 360 degrees, in a tropical year, he moves $59^{\circ} 8'$ of a degree every day at a mean rate; and consequently $50'$ of a degree in 20 minutes $17\frac{1}{2}$ seconds of time: therefore he will arrive at the same equinox or solstice when he is $50'$ of a degree short of the same star or fixed point in the heavens from which he set out the year before. So that, with respect to the fixed stars, the sun and equinoctial points fall back (as it were) 30 degrees in 2160 years, which will make the stars appear to have gone 30 deg. forward with respect to the signs of the ecliptic at that time: for the same signs always keep in the same points of the ecliptic, without regard to the constellations.

To explain this by a figure, let the sun be in conjunction with a fixed star at S, suppose in the 30th degree of γ , at any given time. Then, making 2160 revolutions through the ecliptic VWX, at the end of so many sidereal years, he will be found again at S: but at the end of so many Julian years, he will be found at M, short of S: and at the end of so many tropical years he will be found short of M, in the 30th degree of Taurus at T, which has receded back from S to T in that time, by the precession of the equinoctial points γ Aries and ♎ Libra. The arc ST will be equal to the amount of the precession of the

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Precession
of the equi-
noxiis ex-
plained.
Pl. XLVII.
fig. 11.

(1) It is denied by some that the sun appears bigger in winter on account of his greater proximity to the earth than in summer; the reason they give is the increase of refraction by reason of the more oblique position of the sun, and greater quantity of vapours in the air, at that time.

the equinox in 2160 years, at the rate of $50''$ of a degree, or 20 minutes $17\frac{1}{2}$ seconds of time annually: this, in so many years, makes 30 days $10\frac{1}{2}$ hours, which is the difference between 2160 sidereal and tropical years; and the arc MT will be equal to the space moved through by the sun in 2160 times 11 min. 8 sec. or 16 days 13 hours 48 minutes, which is the difference between 2160 Julian and tropical years.

The anticipation of the equinoxes, and consequently of the seasons, is by no means owing to the precession of the equinoctial and solstitial points in the heavens (which can only affect the apparent motions, places, and declinations, of the fixed stars), but to the difference between the civil and solar year, which is 11 minutes 3 seconds; the civil year containing 365 days 6 hours, and the solar year 365 days 5 hours 48 minutes 57 seconds.

The above 11 minutes 3 seconds, by which the civil or Julian year exceeds the solar, amounts to 11 days in 1433 years; and so much our seasons have fallen back with respect to the days of the months, since the time of the Nicene council in A. D. 325; and therefore, in order to bring back all the fasts and festivals to the days then settled, it was requisite to suppress 11 nominal days: and, that the same seasons might be kept to the same times of the year for the future, to leave out the bissextile-day in February at the end of every century of years not divisible by 4; reckoning them only common years, as the 17th, 18th, and 19th centuries, viz. the years 1700, 1800, 1900, &c. became a day intercalated every fourth year was too much; and retaining the bissextile-day at the end of those centuries of years which are divisible by 4, as the 16th, 20th, and 24th, centuries, viz. the years 1600, 2000, 2400, &c. Otherwise, in length of time, the seasons would be quite reversed with regard to the months of the year; though it would have required near 23,783 years to have brought about such a total change. If the earth had made exactly $365\frac{1}{4}$ diurnal rotations on its axis, whilst it revolved from any equinoctial or solstitial point to the same again, the civil and solar years would always have kept pace together, and the style would never have needed any alteration.

Having thus mentioned the cause of the precession of the equinoctial points in the heavens, which occasions a slow deviation of the earth's axis from its parallelism, and thereby a change of the declination of the stars from the equator, together with a slow apparent motion of the stars forward with respect to the signs of the ecliptic, we shall now explain the phenomena by a diagram.

PL. XLVII. *fig. 2.* Let NZSVL be the earth, SONA its axis produced to the starry heavens, and terminating in A, the present north pole of the heavens, which is vertical to N the north pole of the earth. Let EOQ be the equator, T \propto Z the tropic of Cancer, and VT $\frac{1}{2}$ the tropic of Capricorn; VOZ the ecliptic, and BO its axis, both which are immovable among the stars. But as the equinoctial points recede in the ecliptic, the earth's axis SON is in motion upon the earth's centre O, in such a manner, as to describe the double cone NO \propto and SO \propto , round the axis of the ecliptic BO, in the time that the equinoctial points move quite round the ecliptic, which is 25,920 years; and in that length of time, the north pole of the earth's axis produced, de-

scribes the circle ABCDA in the starry heavens, round the pole of the ecliptic, which keeps immovable in the centre of that circle. The earth's axis being $23\frac{1}{2}$ degrees inclined to the axis of the ecliptic, the circle ABCDA described by the north pole of the earth's axis produced to A, is 47 degrees in diameter, or double the inclination of the earth's axis. In consequence of this, the point A, which at present is the north pole of the heavens, and near to a star of the second magnitude in the tail of the constellation called *the little bear*, must be deflected by the earth's axis, which moving backwards a degree every 72 years, will be directed towards the star or point B in 6480 years hence; and in double of that time, or in 12,960 years, it will be directed towards the star or point C, which will then be the north pole of the heavens, although it is at present $8\frac{1}{2}$ degrees south of the zenith of London L. The present position of the equator EOQ, will then be changed into \propto O ρ , the tropic of Cancer T \propto Z into Vt \propto , and the tropic of Capricorn VT $\frac{1}{2}$ into t $\frac{1}{2}$ Z; as is evident by the figure. And the sun, in the same part of the heavens where he is now over the earthly tropic of Capricorn, and makes the shortest days and longest nights in the northern hemisphere, will then be over the earthly tropic of Cancer, and make the days longest and nights shortest. So that it will require 12,960 years yet more, or 25,920 from the then present time, to bring the north pole N quite round, so as to be directed toward that point of the heavens which is vertical to it at present. And then, and not till then, the same stars which at present describe the equator; tropics, and polar circles, &c. by the earth's diurnal motion, will describe them over again.

From the shifting of the equinoctial points, and with them all the signs of the ecliptic, it follows that those stars which in the infancy of astronomy were in Aries are now got into Taurus; those of Taurus into Gemini, &c. Hence likewise it is that the stars which rose or set at any particular season of the year, in the times of Hesiod, Eudoxus, Virgil, Pliny, &c. by no means answer at this time to their descriptions.

The moon is not a planet, but only a satellite or attendant of the earth, going round the earth from ¹³⁹Of the moon. change to change in 29 days 12 hours and 44 minutes, and round the sun with it every year. The moon's diameter is 2180 miles; and her distance from the earth's centre is 240,000. She goes round her orbit in 27 days 7 hours 43 minutes, moving about 2290 miles every hour; and turns round her axis exactly in the time that she goes round the earth, which is the reason of her keeping always the same side towards us, and that her day and night taken together is as long as our lunar month.

The moon is an opaque globe like the earth, and shines only by reflecting the light of the sun: therefore, whilst that half of her which is towards the sun is enlightened, the other half must be dark and invisible. Hence she disappears when she comes between us and the sun; because her dark side is then towards us. When she is gone a little way forward, we see a little of her enlightened side; which still increases to our view, as she advances forward, until she comes to be opposite to the sun; and then her whole enlightened side is towards the earth, and she appears with a round illuminated orb, which we call the *full moon*; her dark side being then ¹³⁹Reflects the sun's light. turned

turned away from the earth. From the full she seems to decrease gradually as she goes through the other half of her course; shewing us less and less of her enlightened side every day, till her next change or conjunction with the sun, and then she disappears as before.

PL. XLIII. Her orbit is represented in the scheme by the little circle m , upon the earth's orbit \odot : but it is drawn more than fifty times too large in proportion to the earth's; and yet is almost too small to be seen in the diagram.

The moon has scarce any difference of seasons; her axis being almost perpendicular to the ecliptic. What is very singular, one half of her has no darkness at all; the earth constantly affording it a strong light in the sun's absence; while the other half has a fortnight's darkness and a fortnight's light by turns.

140
Earth appears a moon to our moon.

Our earth is thought to be a moon to the moon; waxing and waning regularly, but appearing 13 times as big, and affording her 13 times as much light as she does us. When she changes to us, the earth appears full to her; and when she is in her first quarter to us, the earth is in its third quarter to her; and *vice versa*.

But from one half of the moon, the earth is never seen at all: from the middle of the other half, it is always seen over head; turning round almost 30 times as quick as the moon does. From the circle which limits our view of the moon, only one half of the earth's side next her is seen; the other half being hid below the horizon of all places on that circle. To her the earth seems to be the biggest body in the universe; for it appears 13 times as big as she does to us.

As the earth turns round its axis, the several continents, seas, and islands, appear to the moon's inhabitants like so many spots of different forms and brightness, moving over its surface; but much fainter at some times than others, as our clouds cover them or leave them. By these spots the Lunarians can determine the time of the earth's diurnal motion, just as we do the motion of the sun: and perhaps they measure their time by the motion of the earth's spots; for they cannot have a truer dial.

141
How the Lunar inhabitants can measure their year.

The moon's axis is so nearly perpendicular to the ecliptic, that the sun never removes sensibly from her equator; and the obliquity of her orbit, which is next to nothing as seen from the sun, cannot cause the sun to decline sensibly from her equator. Yet her inhabitants are not destitute of means for ascertaining the length of their year, tho' their method and ours must differ. For we can know the length of our year by the return of our equinoxes; but the Lunarians, having always equal day and night, must have recourse to another method: and we may suppose, they measure their year by observing when either of the poles of our earth begins to be enlightened, and the other to disappear, which is always at our equinoxes; they being conveniently situated for observing great tracks of land about our earth's poles, which are entirely unknown to us. Hence we may conclude, that the year is of the same absolute length both to the earth and moon, though very different as to the number of days: we having $365\frac{1}{4}$ natural days, and the Lunarians only $12\frac{2}{7}$, every day and night in the moon being as long as $29\frac{1}{2}$ on the earth.

142
Longitude easily found. The moon's inhabitants on the side next the earth may as easily find the longitude of their places as we

can find the latitude of ours. For the earth keeping constantly, or very nearly so, over one meridian of the moon, the east or west distances of places from that meridian are as easily found, as we can find our distance from the equator by the altitude of our celestial poles.

As the sun can only enlighten that half of the earth which is at any moment turned towards him, and, being withdrawn from the opposite half, leaves it in darkness; so he likewise doth to the moon: only with this difference, that as the earth is surrounded by an atmosphere, we have twilight after the sun sets; but if the moon has none of her own, nor is included in that of the earth, the lunar inhabitants have an immediate transition from the brightest sun-shine to the blackest darkness. For, let t r k s w be the earth, and A , B , C , D , E , F , G , H , the moon in eight different parts of her orbit. As the earth turns round its axis from west to east, when any place comes to t the twilight begins there, and when it revolves from thence to r the sun S rises; when the place comes to s the sun sets, and when it comes to w the twilight ends. But as the moon turns round her axis, which is only once a month, the moment that any point of her surface comes to e (see the moon at G), the sun rises there without any previous warning by twilight; and when the same point comes to s the sun sets, and that point goes into darkness as black as at midnight.

143
Her phases explained.

The moon being an opaque spherical body (for her hills take off no more from her roundness than the inequalities on the surface of an orange takes off from its roundness), we can only see that part of the enlightened half of her which is towards the earth. And therefore, when the moon is at A , in conjunction with the sun S , her dark half is towards the earth, and she disappears, as at a , there being no light on that half to render it visible. When she comes to her first octant at B , or has gone an eighth part of her orbit from her conjunction, a quarter of her enlightened side is towards the earth, and she appears horned, as at b . When she has gone a quarter of her orbit from between the earth and sun to C , she shews us one half of her enlightened side, as at c , and we say she is a quarter old. At D , she is in her second octant; and by shewing us more of her enlightened side she appears gibbous, as at d . At E , her whole enlightened side is towards the earth; and therefore she appears round, as at e ; when we say it is full moon. In her third octant at F , part of her dark side being towards the earth, she again appears gibbous, and is on the decrease, as at f . At G , we see just one half of her enlightened side; and she appears half decreased, or in her third quarter, as at g . At H , we only see a quarter of her enlightened side, being in her fourth octant; where she appears horned, as at h . And at A , having completed her course from the sun to the sun again, she disappears; and we say it is new moon. Thus, in going from A to E , the moon seems continually to increase; and in going from E to A , to decrease in the same proportion; having like phases at equal distances from A to E , but as seen from the sun S she is always full.

The moon appears not perfectly round when she is full in the highest or lowest part of her orbit, because we have not a full view of her enlightened side at that time. When full in the highest part of her orbit, a small

144
Never appears perfectly round.

small deficiency appears on her lower edge; and the contrary when full in the lowest part of her orbit.

It is plain by the figure, that when the moon changes to the earth, the earth appears full to the moon; and *vice versa*. For when the moon is at A, new to the earth, the whole enlightened side of the earth is towards the moon; and when the moon is at E, full to the earth, its dark side is towards her. Hence a new moon answers to a full earth, and a full moon to a new earth. The quarters are also reversed to each other.

145
Agreeable
representa-
tion of her
phases.

Between the third quarter and change, the moon is frequently visible in the forenoon, even when the sun shines; and then she affords us an opportunity of seeing a very agreeable appearance, where-ever we find a globular stone above the level of the eye, as suppose on the top of a gate. For, if the sun shines on the stone, and we place ourselves so as the upper part of the stone may just seem to touch the point of the moon's lowermost horn, we shall then see the enlightened part of the stone exactly of the same shape with the moon; horned as she is, and inclined the same way to the horizon. The reason is plain; for the sun enlightens the stone the same way as he does the moon: and both being globes, when we put ourselves into the above situation, the moon and stone have the same position to our eyes; and therefore we must see as much of the illuminated part of the one as of the other.

The position of the moon's cusps, or a right line touching the points of her horns, is very differently inclined to the horizon at different hours of the same days of her age. Sometimes she stands, as it were, upright on her lower horn, and then such a line is perpendicular to the horizon: when this happens, she is in what the astronomers call the *monagefimal degree*; which is the highest point of the ecliptic above the horizon at that time, and is 90 degrees from both sides of the horizon where it is then cut by the ecliptic. But this never happens when the moon is on the meridian, except when she is at the very beginning of Cancer or Capricorn.

146
Nonagefi-
mal degree.

That the moon turns round her axis in the time that she goes round her orbit, is quite demonstrable; for, a spectator at rest, without the periphery of the moon's orbit, would see all her sides turned regularly towards him in that time. She turns round her axis from any star to the same star again in 27 days 8 hours; from the sun to the sun again in $29\frac{1}{2}$ days: the former is the length of her sidereal day, and the latter the length of her solar day. A body moving round the sun would have a solar day in every revolution, without turning on its axis; the same as if it had kept all the while at rest, and the sun moved round it: but without turning round its axis it could never have any sidereal day, because it would always keep the same side towards any given star.

If the earth had no annual motion, the moon would go round it so as to complete a lunation, a sidereal, and a solar day, all in the same time. But, because the earth goes forward in its orbit while the moon goes round the earth in her orbit, the moon must go as much

more than round her orbit from change to change in completing a solar day, as the earth has gone forward in its orbit during that time, i. e. almost a twelfth part of a circle.

If the earth had no annual motion, the moon's motion round the earth, and her track in open space, would be always the same (x). But as the earth and moon move round the sun, the moon's real path in the heavens is very different from her visible path round the earth; the latter being in a progressive circle, and the former in a curve of different degrees of concavity, which would always be the same in the same parts of the heavens, if the moon performed a complete number of lunations in a year without any fraction.

147
Delineation
of her path
round the
sun.

Let a nail in the end of the axle of a chariot-wheel represent the earth, and a pin in the nave the moon; if the body of the chariot be propped up so as to keep that wheel from touching the ground, and the wheel be then turned round by hand, the pin will describe a circle both round the nail and in the space it moves through. But if the props be taken away, the horses put to, and the chariot driven over a piece of ground which is circularly convex; the nail in the axle will describe a circular curve, and the pin in the nave will still describe a circle round the progressive nail in the axle, but not in the space through which it moves. In this case, the curve described by the nail will resemble in miniature as much of the earth's annual path round the sun, as it describes whilst the moon goes as often round the earth as the pin does round the nail: and the curve described by the pin will have some resemblance of the moon's path during so many lunations.

Let us now suppose that the radius of the circular PL XLVII. curve described by the nail in the axle is to the radius fig. 4. of the circle which the pin in the nave describes round the axle, as $337\frac{1}{2}$ to 1; (L) which is the proportion of the radius or semidiameter of the earth's orbit to that of the moon's, or of the circular curve A 1234567B, &c. to the little circle a; and then, whilst the progressive nail describes the said curve from A to E, the pin will go once round the nail with regard to the centre of its path, and in so doing will describe the curve *abcde*. The former will be a true representation of the earth's path for one lunation, and the latter of the moon's for that time. Here we may set aside the inequalities of the moon's motion, and also the earth's moving round its common centre of gravity and the moon's: all which, if they were truly copied in this experiment, would not sensibly alter the figure of the paths described by the nail and pin, even though they should rub against a plain upright surface all the way, and leave their tracks visible upon it. And if the chariot was driven forward on such a convex piece of ground, so as to turn the wheel several times round, the track of the pin in the nave would still be concave toward the centre of the circular curve described by the nail in the axle; as the moon's path is always concave to the sun in the centre of the earth's annual orbit.

In this diagram, the thickest curve line ABCDE, with

(x) In this place, we may consider the orbits of all the satellites as circular, with respect to their primary planets; because the eccentricities of their orbits are too small to affect the phenomena here described.

(L) The figure by which this is illustrated is borrowed from Mr Ferguson, whom we principally follow in our explanations of the phenomena. Later observations have determined the proportions to be different; but we cannot find that any delineation of this kind hath been given by astronomers, according to the new proportions.

with the numeral figures set to it, represents as much of the earth's annual orbit as it describes in 32 days from west to east; the little circles at A, B, C, D, E, shew the moon's orbit in due proportion to the earth's; and the smallest curve *a C f* represents the line of the moon's path in the heavens for 32 days, accounted from any particular new moon at *a*. The sun is supposed to be in the centre of the curve A 1 2 3 4 5 6 7 B, &c. and the small dotted circles upon it represent the moon's orbit, of which the radius is in the same proportion to the earth's path in this scheme, that the radius of the moon's orbit in the heavens was supposed to bear to the radius of the earth's annual path round the sun; that is, as 240,000, to 81,000,000, or as 1 to 337½.

When the earth is at A, the new moon is at *a*; and in the seven days that the earth describes the curve 1 2 3 4 5 6 7, the moon in accompanying the earth describes the curve *a b*; and is in her first quarter at *b* when the earth is at B. As the earth describes the curve B 8 9 10 11 12 13 14, the moon describes the curve *b c*; and is at *c*, opposite to the sun, when the earth is at C. Whilst the earth describes the curve C 15 16 17 18 19 20 21 22, the moon describes the curve *c d*; and is in her third quarter at *d* when the earth is at D. And lastly, whilst the earth describes the curve D 23 24 25 26 27 28 29, the moon describes the curve *d e*; and is again in conjunction at *e* with the sun when the earth is at E, between the 29th and 30th day of the new moon's age, accounted by the numeral figures from the new moon at A. In describing the curve *a C e*, the moon goes round the progressive earth as really as if she had kept in the dotted circle A, and the earth continued immovable in the centre of that circle.

148
Her path
always con-
cave to the
Sun.

And thus we see, that although the moon goes round the earth in a circle, with respect to the earth's centre, her real path in the heavens is not very different in appearance from the earth's path. To shew that the moon's path is concave to the sun, even at the time of change, it is carried on a little farther into a second lunation, as to *f*.

The moon's absolute motion from her change to her first quarter, or from *a* to *b*, is so much slower than the earth's, that she falls 240,000 miles (equal to the semidiameter of her orbit) behind the earth at her first quarter in *b*, when the earth is in B; that is, she falls back a space equal to her distance from the earth. From that time her motion is gradually accelerated to her opposition or full at *c*; and then she is come up as far as the earth, having regained what she lost in her first quarter from *a* to *b*. From the full to the last quarter at *d*, her motion continues accelerated so as to be just as far before the earth at *d*, as she was behind it at her first quarter in *b*. But from *d* to *e* her motion is retarded so, that she loses as much with respect to the earth as is equal to her distance from it, or to the semidiameter of her orbit; and by that means she comes to *e*, and is then in conjunction with the sun as seen from the earth at E. Hence we find, that the moon's absolute motion is slower than the earth's from her third quarter to her first, and swifter than the earth's from her first quarter to her third; her path being less curved than the earth's in the former case, and more in the latter. Yet it is still bent the same way towards the sun; for if we imagine the concavity of the earth's orbit to be measured by the length of a per-

pendicular line C *g*, let down from the earth's place upon the straight line *b g d* at the full of the moon, and connecting the places of the earth at the end of the moon's first and third quarters, that length will be about 640,000 miles; and the moon when new only approaching nearer to the sun by 240,000 miles than the earth is, the length of the perpendicular let down from her place at that time upon the same straight line, and which shews the concavity of that part of her path, will be about 400,000 miles.

The moon's path being concave to the sun throughout, demonstrates that her gravity towards the sun, at her conjunction, exceeds her gravity towards the earth; and if we consider that the quantity of matter in the sun is vastly greater than the quantity of matter in the earth, and that the attraction of each body diminishes as the square of the distance from it increases, we shall soon find, that the point of equal attraction between the earth and the sun, is much nearer the earth than the moon is at her change. It may then appear surprising that the moon does not abandon the earth when she is between it and the sun, because she is considerably more attracted by the sun than by the earth at that time. But this difficulty vanishes when we consider, that a common impulse on any system of bodies affects not their relative motions; but that they will continue to attract, impel, or circulate round one another, in the same manner as if there was no such impulse. The moon is so near the earth, and both of them so far from the sun, that the attractive power of the sun may be considered as equal on both; and therefore the moon will continue to circulate round the earth in the same manner as if the sun did not attract them at all: like bodies in the cabin of a ship, which may move round or impel one another in the same manner when the ship is under sail, as when it is at rest; because they are all equally affected by the common motion of the ship. If by any other cause, such as the near approach of a comet, the moon's distance from the earth should happen to be so much increased, that the difference of their gravitating forces towards the sun should exceed that of the moon towards the earth; in that case, the moon, when in conjunction, would abandon the earth, and be either drawn into the sun, or comet, or circulate round about it.

The ruggedness of the moon's surface mentioned n°40, 41. is of great use to us, by reflecting the sun's light to all sides: for if the moon were smooth and polished like a looking-glass, or covered with water, she could never distribute the sun's light all round; only in some positions she would shew us his image, no bigger than a point, but with such a lustre as would be hurtful to our eyes.

The moon's surface being so uneven, many have wondered why her edge appears not jagged, as well as the curve bounding the light and dark places. But if we consider, that what we call the edge of the moon's disk is not a single line set round with mountains, in which case it would appear irregularly indented, but a large zone having many mountains lying behind one another from the observer's eye, we shall find that the mountains in some rows will be opposite to the vales in others; and so fill up the inequalities as to make her appear quite round: just as when one looks at an orange, although its roughness be very discernible on the

149
A difficulty
concerning
attraction
solved.

150
Why her
edge appears
always even.

the side next the eye, especially if the sun or a candle shines obliquely on that side, yet the line terminating the visible part still appears smooth and even.

153
Of Mars.

Pl. XLIII.
fig. 1.

The planet Mars comes next in order, being the first above the earth's orbit. His distance from the sun is computed to be 145,014,148 miles; and by travelling at the rate of 55,287 miles every hour, as in the circle *3*, he goes round the sun in 686 of our days and 23 hours; which is the length of his year, and contains $667\frac{1}{2}$ of his days; every day and night together being 40 minutes longer than with us. His diameter is 5400 miles, and by his diurnal rotation the inhabitants about his equator are carried 669 miles every hour. His quantity of light and heat is equal but to one half of ours; and the sun appears but half as big to him as to us.

This planet being but a fifth part so big as the earth, if any moon attends him, he must be very small, and has not yet been discovered by our best telescopes. To Mars, our earth and moon appear like two moons, a bigger and a less; changing places with one another, and appearing sometimes horned, sometimes half or three quarters illuminated, but never full; nor at most above one quarter of a degree from each other, altho' they are 240,000 miles asunder.

Our earth appears almost as big to Mars as Venus does to us, and at Mars it is never seen above 48 degrees from the sun; sometimes it appears to pass over the disk of the sun, and so do Mercury and Venus: but Mercury can never be seen from Mars by such eyes as ours, unassisted by proper instruments; and Venus will be as seldom seen as we see Mercury. Jupiter and Saturn will appear bigger to Mars than to us. His axis is perpendicular to the ecliptic, and his orbit is two degrees inclined to it.

152
Of Jupiter.

Jupiter, the biggest of all the planets, is still higher in the system, being 494,990,976 miles from the sun; and going at the rate of 29,083 miles every hour in his orbit, as in the circle *2*, finishes his annual period in eleven of our years 314 days and 12 hours. He is above 1300 times as big as the earth; for his diameter is 94,000 miles, which is more than eleven times the diameter of the earth.

Jupiter turns round his axis in 9 hours 56 minutes; so that his year contains 10,470 days; and the diurnal velocity of his equatorial parts is greater than the swiftness with which he moves in his annual orbit; a singular circumstance, as far as we know. By this prodigious quick rotation, his equatorial inhabitants are carried 29,542 miles every hour (which is 4000 miles in one hour more than an inhabitant of our earth's equator moves in 24 hours), besides the 29,083 abovementioned, which is common to all parts of his surface, by his annual motion. By this prodigiously swift rotation on his axis the centrifugal force of his equatorial parts is able to shorten his polar diameter by $\frac{1}{12}$ of the whole, so that the difference is very perceptible through a good telescope.

153
His no sensible change of seasons.

The axis of Jupiter is so nearly perpendicular to his orbit, that he has no sensible change of seasons; which is a great advantage, and wisely ordered by the Author of Nature. For, if the axis of this planet were inclined any considerable number of degrees, just so many degrees round each pole would in their turn be almost fix of our years together in darkness. And, as

each degree of a great circle on Jupiter contains 820 of our miles at a mean rate, it is easy to judge what vast tracts of land would be rendered uninhabitable by any considerable inclination of his axis.

The sun appears but $\frac{1}{12}$ part so big to Jupiter as to us; and his light and heat are in the same small proportion, but compensated by the quick returns thereof, and by four moons (some bigger and some less than our earth) which revolve about him: so that there is scarce any part of this huge planet but what is during the whole night enlightened by one or more of these moons, except his poles, whence only the farthest moons can be seen, and where their light is not wanted, because the sun constantly circulates in or near the horizon, and is very probably kept in view of both poles by the refraction of Jupiter's atmosphere, which, if it be like ours, has certainly refractive power enough for that purpose.

The orbits of these moons are represented in the scheme of the solar system by four small circles marked 1. 2. 3. 4. on Jupiter's orbit *2*; but they are drawn greatly too large in proportion to it. The first moon, or that nearest to Jupiter, goes round him in 1 day 18 hours and 36 minutes of our time; and is 266,332 miles distant from his centre: The second performs its revolution in 3 days 13 hours and 15 minutes, at 423,000 miles distance: The third in 7 days 3 hours and 59 minutes, at the distance of 676,078 miles: and the fourth, or outermost, in 16 days 18 hours and 30 minutes, at the distance of 1,189,148 miles from his centre.

The angles under which the orbits of Jupiter's moons are seen from the earth, at its mean distance from Jupiter, are as follow: The first, $3^{\circ} 55'$; the second, $6^{\circ} 14'$; the third, $9^{\circ} 58'$; and the fourth, $17^{\circ} 30'$. And their distances from Jupiter, measured by his semidiameters, are thus: The first $5\frac{1}{2}$; the second, 9; the third, $14\frac{1}{2}$; and the fourth, $25\frac{3}{8}$. This planet, seen from its nearest moon, appears 1000 times as large as our moon does to us; waxing and waning in all her monthly shapes, every 10 hours.

Jupiter's three nearest moons fall into his shadow, and are eclipsed in every revolution: but the orbit of the fourth moon is so much inclined, that it passeth by its opposition to Jupiter, without falling into his shadow, 11 times.

two years in every six. By these eclipses, astronomers have not only discovered that the sun's light takes up eight minutes of time in coming to us; but they have also determined the longitudes of places on this earth with greater certainty and facility, than by any other method yet known.

Jupiter's orbit is 1 degree 20 minutes inclined to the ecliptic. His north node is in the 7th degree of Cancer, and his south node in the 7th degree of Capricorn.

The curves which Jupiter's satellites describe, are all of different sorts from the path described by our moon, although these satellites go round Jupiter, as the moon goes round the earth. Let ABCDE, &c. be as much of Jupiter's orbit as he describes in 18 days from A to T; and the curves *a, b, c, d* will be the paths of his Pl. XLVII.

155
Delineation of the paths of his satellites.

four moons going round him in his progressive motion, fig. 5. Now let us suppose all these moons to set out from a conjunction with the sun, as seen from Jupiter at A; then, his first or nearest moon will be at *a*, his second at *b*, his third at *c*, and his fourth at *d*. At the end

of

of 24 terrestrial hours after this conjunction, Jupiter has moved to B, his first moon or satellite has described the curve *a* 1, his second the curve *b* 1, his third *c* 1, and his fourth *d* 1. The next day, when Jupiter is at C, his first satellite has described the curve *a* 2, from its conjunction, his second the curve *b* 2, his third the curve *c* 2, and his fourth the curve *d* 2, and so on. The numeral figures under the capital letters show Jupiter's place in his path every day for 18 days, accounted from A to T; and the like figures set to the paths of his satellites, shew where they are at the like times. The first satellite, almost under C, is stationary at + as seen from the sun, and retrograde from + to 2: at 2 it appears stationary again, and thence it moves forward until it has past 3, and is twice stationary and once retrograde between 3 and 4. The path of this satellite intersects itself every $42\frac{1}{2}$ hours, making such loops as in the diagram at 2, 3, 5, 7, 9, 10, 12, 14, 16, 18, a little after every conjunction. The second satellite *b*, moving slower, barely crosses its path every 3 days 13 hours; as at 4, 7, 11, 14, 18, making only five loops and as many conjunctions in the time that the first makes ten. The third satellite *c* moving still slower, and having described the curve *c* 1, 2, 3, 4, 5, 6, 7, comes to an angle at 7 in conjunction with the sun at the end of 7 days four hours; and so goes on to describe such another curve 7, 8, 9, 10, 11, 12, 13, 14, and is at 14 in its next conjunction. The fourth satellite *d* is always progressive, making neither loops nor angles in the heavens; but comes to its next conjunction at *e* between the numeral figures 16 and 17, or in 16 days 18 hours.

The method used by Mr Ferguson to delineate the paths of these satellites was the following. Having drawn their orbits on a card, in proportion to their relative distances from Jupiter, he measured the radius of the orbit of the fourth satellite, which was an inch and $\frac{1}{1000}$ parts of an inch; then multiplied this by 424 for the radius of Jupiter's orbit, because Jupiter is 424 times as far from the sun's centre as his fourth satellite is from his centre; and the product thence arising was $483\frac{1}{9}$ inches. Then taking a small cord of this length, and fixing one end of it to the floor of a long room by a nail, with a black-lead pencil at the other end he drew the curve ABCD &c. and set off a degree and half thereon, from A to T; because Jupiter moves only so much, whilst his outermost satellite goes once round him, and somewhat more; so that this small portion of so large a circle differs but very little from a straight line. This done, he divided the space AT into 18 equal parts, as AB, BC, &c. for the daily progress of Jupiter; and each part into 24 for his hourly progress. The orbit of each satellite was also divided into as many equal parts as the satellite is hours in finishing its synodical period round Jupiter. Then drawing a right line through the centre of the card, as a diameter to all the four orbits upon it, he put the card upon the line of Jupiter's motion, and transferred it to every horary division thereon, keeping always the said diameter-line on the line of Jupiter's path; and running a pin through each horary division in the orbit of each satellite as the card was gradually transferred along the line ABCD &c. of Jupiter's motion, he marked points for every hour through the card for the curves described by the satellites, as the

primary planet in the centre of the card was carried forward on the line; and so finished the figure, by drawing the lines of each satellite's motion through those (almost innumerable) points: by which means, this is perhaps as true a figure of the paths of the satellites as can be defined. And in the same manner might those of Saturn's satellites be delineated.

It appears by the scheme, that the three first satellites come almost into the same line or position every seventh day; the first being only a little behind with the second, and the second behind with the third. But the period of the fourth satellite is so incommensurate to the periods of the other three, that it cannot be guessed at by the diagram when it would fall again into a line of conjunction with them, between Jupiter and the sun. And no wonder; for supposing them all to have been once in conjunction, it will require $3,087,043,493,260$ years to bring them in conjunction again.

Saturn, the remotest of all the planets, is about $907,956,130$ miles from the sun; and, travelling at the rate of $22,101$ miles every hour, as in the circle marked *h*, performs its annual circuit in 29 years 167 days and 5 hours of our time; which makes only one year to that planet. Its diameter is $78,000$ miles; and therefore it is near 1000 times as big as the earth.

To Saturn the sun appears only $\frac{1}{25}$ part so big as to us; and the light and heat he receives from the sun are in the same proportion to ours. But, to compensate for the small quantity of sun-light, he has five moons, all going round him on the outside of his ring, and nearly in the same plane with it. The first or nearest moon to Saturn, goes round him in one day 21 hours 19 minutes; and is $140,000$ miles from his centre: the second, in 2 days 17 hours 40 minutes, at the distance of $187,000$ miles: the third, in 4 days 12 hours 25 minutes; at $263,000$ miles distance: the fourth, in 15 days 22 hours 41 minutes; at the distance of $600,000$ miles: and the fifth, or outermost, at $1,800,000$ miles from Saturn's centre, goes round him in 79 days 7 hours 48 minutes. Their orbits in the scheme of the solar system are represented by the five small circles marked 1, 2, 3, 4, 5, on Saturn's orbit; but these, like the orbits of the other satellites, are drawn vastly too large in proportion to the orbits of their primary planets.

The sun shines almost 15 of our years together on one side of Saturn's ring without setting, and as long on the other in its turn. So that the ring is visible to the inhabitants of that planet for almost 15 of our years, and as long invisible, by turns, if its axis has no inclination to its ring; but if the axis of the planet be inclined to the ring, suppose about 30 degrees, the ring will appear and disappear once every natural day to all the inhabitants within 30 degrees of the equator, on both sides, frequently eclipsing the sun on a Saturnian day. Moreover, if Saturn's axis be so inclined to his ring, it is perpendicular to his orbit; and thereby the inconvenience of different seasons to that planet is avoided. For, considering the length of Saturn's year, which is almost equal to thirty of ours, what a dreadful condition must the inhabitants of his polar regions be in, if they be half that time deprived of the light and heat of the sun? which is not their case alone, if the axis of the planet be perpendicular to the ring; for then the

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Of Saturn.
Pl. XLIII.
fig. 1.

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Phenomena of his ring.

ring

ring must hide the sun from vast tracts of land on each side of the equator for 13 or 14 of our years together, on the south side and north side by turns, as the axis inclines to or from the sun: the reverse of which inconvenience is another good presumptive proof of the inclination of Saturn's axis to his ring, and also of his axis being perpendicular to his orbit.

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Phenomena
of Saturn's
ring.

This ring, seen from Saturn, appears like a vast luminous arch in the heavens, as if it did not belong to the planet. When we see the ring most open, its shadow upon the planet is broadest; and from that time the shadow grows narrower, as the ring appears to do to us; until, by Saturn's annual motion, the sun comes to the plane of the ring, or even with its edge; which being then directed towards us, becomes invisible on account of its thinness; the ring disappears twice in every annual revolution of Saturn, namely, when he is in the 19th degree both of Pisces and of Virgo. And when Saturn is in the middle between these points, or in the 19th degree either of Gemini or of Sagittarius, his ring appears most open to us; and then its longest diameter is to its shortest, as 9 to 4.

As Saturn goes round the sun, his obliquely posited ring, like our earth's axis, keeps parallel to itself, and is therefore turned edgewise to the sun twice in a Saturnian year, which is almost as long as 30 of our years. But the ring, though considerably broad, is too thin to be seen by us when it is turned edgewise to the sun, at which time it is also edgewise to the earth; and therefore it disappears once in every 15 years to us. As the sun shines half a year together on the north pole of our earth, then disappears to it, and shines as long on the south pole; so, during one half of Saturn's year, the sun shines on the north side of his ring, then disappears to it, and shines as long on its south side. When the earth's axis inclines neither to nor from the sun, but sidewise to him, he instantly ceases to shine on one pole, and begins to enlighten the other; and when Saturn's ring inclines neither to nor from the sun, but sidewise to him, he ceases to shine on the one side of it, and begins to shine upon the other.

To such eyes as ours unassisted by instruments, Jupiter is the only planet that can be seen from Saturn, and Saturn the only planet that can be seen from Jupiter. So that the inhabitants of these two planets must either see much farther than we do, or have equally good instruments to carry their sight to remote objects, if they know that there is such a body as our earth in the universe: for the earth is no bigger seen from Jupiter, than his moons are seen from the earth; and if his large body had not first attracted our sight, and prompted our curiosity to view him with a telescope, we should never have known any thing of his moons; unless by chance we had directed the telescope toward that small part of the heavens where they were at the time of observation. And the like is true of the moons of Saturn.

The orbit of Saturn is 2½ degrees inclined to the ecliptic, or orbit of our earth, and intersects it in the 21st degree of Cancer and of Capricorn; so that Saturn's nodes are only 14 degrees from Jupiter's.

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Quantity of
light he en-
joys.

The quantity of light afforded by the sun to Jupiter, being but $\frac{1}{15}$ part, and to Saturn only $\frac{1}{15}$ part, of what we enjoy, may at first thought induce us to believe that these two planets are entirely unfit for ra-

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tional beings to dwell upon. But that their light is not so weak as we imagine, is evident from their brightness in the night time; and also from this remarkable phenomenon, that when the sun is so much eclipsed to us, as to have only the 40th part of his disk left uncovered by the moon, the decrease of light is not very sensible; and just at the end of darkness in total eclipses when his western limb begins to be visible, and seems no bigger than a bit of fine silver wire, every one is surpris'd at the brightness wherewith that small part of him shines. The moon, when full, affords travellers light enough to keep them from mistaking their way; and yet, according to Mr Bogue, the light of the sun is 300,000 times as strong as that of the moon. Consequently, the sun gives almost 10,360 times as much light to Saturn, as the full moon does to us; and above 30,000 times as much to Jupiter. So that these two planets, even without any moons, would be much more enlightened than we at first imagine; and, by having so many, they may be very comfortable places of residence. Their heat, so far as it depends on the force of the sun's rays, is certainly much less than ours; to which no doubt the bodies of their inhabitants are as well adapted as ours are to the seasons we enjoy. And if we consider that Jupiter never has any winter, even at his poles, which probably is also the case with Saturn, the cold cannot be so intense on these two planets as is generally imagined. Besides, there may be something in the nature of their mould warmer than in that of our earth; and we find that all our heat depends not on the rays of the sun; for if it did, we should always have the same months equally hot or cold at their annual returns. But it is far otherwise, for February is sometimes warmer than May; which must be owing to vapours and exhalations from the earth.

In the Philosophical Transactions a method is proposed by Mr Azout for knowing how much Jupiter or Saturn are illuminated experimentally. It is by admitting the sun's rays into a dark room through a convex lens; when being collected into a focus, they will afterwards diverge to any distance we please. This experiment, however, will be apt to raise doubts in the minds of those who try it, either with regard to the diminution of the sun's light at those distances, or with regard to the substances of the planets. For it is certain, that the brightness of the superior planets is far from being diminished in the proportion that it ought to be were all the wandering bodies in our system of a similar substance. Jupiter, for instance, as he hath not the 50th part of the light that Venus hath, seeing he is removed to such a distance as to appear as small as she does, ought to shine with only the 50th part of her lustre: but it is manifest he has much more; of consequence, either the sun's light must be stronger at Jupiter than is commonly supposed, or he must be formed of a substance more capable of reflecting the light than Venus.

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Mr Azout's
method of
measuring the
light on
Jupiter and
Saturn.

In fig. 2. we have a view of the proportional breadth of the sun's face or disk, as seen from the different planets. The sun is represented N° 1. as seen from Mercury; N° 2. as seen from Venus; N° 3. as seen from the earth; N° 4. as seen from Mars; N° 5. as seen from Jupiter; and, N° 6. as seen from Saturn.

Let the circle B (fig. 3.) be the sun as seen from any planet, at a given distance: to another planet, at double

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that

that distance, the sun will appear just of that breadth, as A; which contains only one fourth part of the area or surface of B. For all circles, as well as square surfaces, are to one another as the squares of their diameters. Thus, the square A (fig. 4.) is just half as broad as the square B; and yet it is plain to fight, that B contains four times as much surface as A. Hence, by comparing the diameters of the above circles (fig. 2.) together, it will be found, that, in round numbers, the sun appears 7 times larger to Mercury than to us, 90 times larger to us than to Saturn, and 630 times as large to Mercury as to Saturn.

Under fig. 3. are the names and characters of the twelve signs of the zodiac, which the reader should be perfectly well acquainted with, so as to know the characters without seeing the names. Each sign contains 30 degrees, as in the circle (fig. 1.) bounding the solar system; to which the characters of the signs are set in their proper places.

Part of the paths of three comets are delineated in the scheme of the solar system, and the years marked in which they made their appearance. It is believed, that there are at least 21 comets belonging to our system, moving in all sorts of directions. Of all these, the periods of the above-mentioned three only are known with any degree of certainty. The first of these comets appeared in the years 1531, 1607, 1682, and 1759; and is expected to appear every 75th year afterwards. The second of them appeared in 1532 and 1661; and may be expected to return in 1789, and every 120th year afterwards. The third, having last appeared in 1680, and its period being no less than 575 years, cannot return until the year 2255. This comet, at its greatest distance, is about 11,200,000,000 miles from the sun; and at its least distance from the sun's centre, which is 490,000 miles, is within less than a third part of the sun's semidiameter from his surface. In that part of its orbit which is nearest the sun, it flies with the amazing swiftness of 880,000 miles in an hour; and the sun, as seen from it, appears an hundred degrees in breadth; consequently, 40,000 times as large as he appears to us. The astonishing length that this comet runs out into empty space, suggests to our minds an idea of the vast distance between the sun and the nearest fixed stars; of whose attractions all the comets must keep clear, to return periodically, and go round the sun: and it shews us also, that the nearest stars, which are probably those that seem the largest, are as big as our sun, and of the same nature with him; otherwise, they could not appear so large and bright to us, as they do, at such an immense distance.

Sect. VI. *Of the Ebbing and Flowing of the Sea, and the Phenomena of the Harvest and Horizontal Moon.*

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Cause of the
tides discovered by
Kepler.

THE cause of the tides was discovered by Kepler, who, in his *Introduction to the Physics of the Heavens*, thus explains it: "The orb of the attracting power, which is in the moon, is extended as far as the earth; and draws the waters under the torrid zone, acting upon places where it is vertical, insensibly on confined seas and bays, but sensibly on the ocean whose beds are large and where the waters have the liberty of reciprocation, that is, of rising and falling." And in the 70th

page of his *Lunar Astronomy*—"But the cause of the tides of the sea appears to be the bodies of the sun and moon drawing the waters of the sea." This hint being given, the immortal Sir Isaac Newton improved it, and wrote so amply on the subject, as to make the theory of the tides in a manner quite his own, by discovering the cause of their rising on the side of the earth opposite to the moon. For Kepler believed, that the preence of the moon occasioned an impulse which caused another in her absence.

It has been already observed, that the power of gravity diminishes as the square of the distance increaseth; and therefore the waters at Z on the side of the earth ABCDEFGH next the moon M are more attracted than the central parts of the earth O by the moon, and the central parts are more attracted by her than the waters on the opposite side of the earth at n; and therefore the distance between the earth's centre and the waters on its surface under and opposite to the moon will be increased. For, let there be three bodies at H, O, and D: if they are all equally attracted by the body M, they will all move equally fast toward it, their mutual distances from each other continuing the same. If the attraction of M is unequal, then that body which is most strongly attracted will move fastest, and this will increase its distance from the other body. Therefore, by the law of gravitation, M will attract H more strongly than it does O, by which the distance between H and O will be increased; and a spectator on O will perceive H rising higher toward Z. In like manner, O being more strongly attracted than D, it will move farther towards M than D does; consequently, the distance between O and D will be increased; and a spectator on O, not perceiving his own motion, will see D receding farther from him towards n: all effects and appearances being the same, whether D recedes from O, or O from D.

Suppose now there is a number of bodies, as A, B, C, D, E, F, G, H, placed round O, so as to form a flexible or fluid ring: then, as the whole is attracted towards M, the parts at H and D will have their distance from O increased; whilst the parts at B and F being nearly at the same distance from M as O is, these, parts will not recede from one another; but rather, by the oblique attraction of M, they will approach nearer to O. Hence, the fluid ring will form itself into an ellipse ZIBLnKFNZ, whose longer axis nOZ produced will pass through M, and its shorter axis BOF will terminate in B and F. Let the ring be filled with fluid particles, so as to form a sphere round O; then, as the whole moves towards M, the fluid sphere being lengthened at Z and n, will assume an oblong or oval form. If M is the moon, O the earth's centre, ABCDEFGH the sea covering the earth's surface, it is evident, by the above reasoning, that whilst the earth by its gravity falls toward the moon, the water directly below her at B will swell and rise gradually towards her; also the water at D will recede from the centre [strictly speaking, the centre recedes from D], and rise on the opposite side of the earth; whilst the water at B and F is depressed, and falls below the former level. Hence as the earth turns round its axis from the moon to the moon again in 24^h hours, there will be two tides of flood and two of ebb in that time, as we find by experience.

161.
Why the
tides are
high at full
moon.

As this explanation of the ebbing and flowing of the sea is deduced from the earth's constantly falling towards the moon by the power of gravity, some may find a difficulty in conceiving how this is possible, when the moon is full, or in opposition to the sun; since the earth revolves about the sun, and must continually fall towards it, and therefore cannot fall contrary ways at the same time: or if the earth is constantly falling towards the moon, they must come together at last. To remove this difficulty, let it be considered, that it is not the centre of the earth that describes the annual orbit round the sun, but the (M) common centre of gravity of the earth and moon together: and that whilst the earth is moving round the sun, it also describes a circle round that centre of gravity; going as many times round it in one revolution about the sun as there are lunations or courses of the moon round the earth in a year: and therefore the earth is constantly falling towards the moon from a tangent to the circle it describes round the said common centre of gravity. Let M be the moon, T W part of the moon's orbit, and C the centre of gravity of the earth and moon; whilst the moon goes round her orbit, the centre of the earth describes the circle *d g e* round C, to which circle *g a k* is a tangent; and therefore when the moon has gone from M to a little past W, the earth has moved from *g* to *e*; and in that time has fallen towards the moon, from the tangent at *a* to *e*: and so on, round the whole circle.

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Influence of
the sun in
raising tides.

The sun's influence in raising the tides is but small in comparison of the moon's; for though the earth's diameter bears a considerable proportion to its distance from the moon, it is next to nothing when compared to its distance from the sun. And therefore the difference of the sun's attraction on the sides of the earth under and opposite to him, is much less than the difference of the moon's attraction on the sides of the earth under and opposite to her; and therefore the moon must raise the tides much higher than they can be raised by the sun.

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Why they
are not
highest
when the
moon is in
the meri-
dian.

On this theory, the tides ought to be highest directly under and opposite to the moon; that is, when the moon is due north and south. But we find, that in open seas, where the water flows freely, the moon M is generally past the north and south meridian, as at *p*, when it is high water at Z and at *n*. The reason is obvious: for though the moon's attraction was to cease altogether when she was past the meridian, yet the motion of ascent communicated to the water before that time would make it continue to rise for some time after; much more must it do so when the attraction is only diminished; as a little impulse given to a moving ball will cause it still to move farther than otherwise it could have done; and as experience shews, that the day is hotter about three in the afternoon, than when the sun is on the meridian, because of the increase made to the heat already imparted.

The tides answer not always to the same distance of the moon from the meridian at the same places; but are variously affected by the action of the sun, which

brings them on sooner when the moon is in her first and third quarters, and keeps them back later when she is in her second and fourth: because, in the former case, the tide raised by the sun alone would be earlier than the tide raised by the moon; and, in the latter case, later.

The moon goes round the earth in an elliptic orbit; and therefore, in every lunar month, she approaches nearer to the earth than her mean distance, and recedes farther from it. When she is nearest, she attracts strongest, and so raises the tides most; the contrary happens when she is farthest, because of her weaker attraction. When both luminaries are in the equator, and the moon in perigee, or at her least distance from the earth, she raises the tides highest of all, especially at her conjunction and opposition; both because the equatorial parts have the greatest centrifugal force from their describing the largest circle, and from the concurring actions of the sun and moon. At the change, the attractive forces of the sun and moon being united, they diminish the gravity of the waters under the moon, and their gravity on the opposite side is diminished by means of a greater centrifugal force. At the full, whilst the moon raises the tide under and opposite to her, the sun, acting in the same line, raises the tide under and opposite to him; whence their conjoint effect is the same as at the change; and, in both cases, occasion what we call the *Spring tides*. But at the quarters the sun's action on the waters at O and H diminishes the effect of the moon's action on the waters at Z and N; so that they rise a little under and opposite to the sun at O and H, and fall as much under and opposite to the moon at Z and N; making what we call the *Neap tides*, because the sun and moon then act cross-wise to each other. But these tides happen not till some time after; because in this, as in other cases, the actions do not produce the greatest effect when they are at the strongest, but some time afterward.

The sun, being nearer the earth in winter than in summer, is of course nearer to it in February and October than in March and September; and therefore the greatest tides happen not till some time after the autumnal equinox, and return a little before the vernal.

The sea, being thus put in motion, would continue to ebb and flow for several times, even though the sun and moon were annihilated, or their influence should cease; as, if a basin of water were agitated, the water would continue to move for some time after the basin was left to stand still; or like a pendulum, which, having been put in motion by the hand, continues to make several vibrations without any new impulse.

When the moon is in the equator, the tides are equally high in both parts of the lunar day, or time of the moon's revolving from the meridian to the meridian again, which is 24 hours 50 minutes. But as the moon declines from the equator towards either pole, the tides are alternately higher and lower at places having north or south latitude. For one of the highest elevations, which is that under the moon, follows her towards the pole to which she is nearest, and the other

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declines

(M) This centre is as much nearer the earth's centre than the moon's as the earth is heavier, or contains a greater quantity of matter than the moon, namely, about 40 times. If both bodies were suspended on it, they would hang in *equilibrium*. So that dividing 240,000 miles, the moon's distance from the earth's centre, by 40, the excess of the earth's weight above the moon's, the quotient will be 6000 miles, which is the distance of the common centre of gravity of the earth and moon from the earth's centre.

declines towards the opposite pole; each elevation describing parallels as far distant from the equator, on opposite sides, as the moon declines from it to either side; and consequently, the parallels described by these elevations of the water are twice as many degrees from one another, as the moon is from the equator; increasing their distance as the moon increases her declination, till it be at the greatest, when the said parallels are, at a mean rate, 47 degrees from one another: and on that day, the tides are most unequal in their heights. As the moon returns towards the equator, the parallels described by the opposite elevations approach towards each other, until the moon comes to the equator, and then they coincide. As the moon declines towards the opposite pole, at equal distances, each elevation describes the same parallel in the other part of the lunar day, which its opposite elevation described before. Whilst the moon has north declination, the greatest tides in the northern hemisphere are when she is above the horizon; and the reverse whilst her declination is south. Let NESQ be the earth, NCS its axis, EQ the equator, T ∞ the tropic of Cancer, t ∞ the tropic of Capricorn, a b the arctic circle, c d the antarctic, N the north pole, S the south pole, M the moon, F and G the two eminences of water, whose lowest parts are at a and d, at N and S, and at b and c, always 90 degrees from the highest. Now, when the moon is in her greatest north declination at M, the highest elevation G under her is on the tropic of Cancer T ∞ , and the opposite elevation F on the tropic of Capricorn t ∞ ; and these two elevations describe the tropics by the earth's diurnal rotation. All places in the northern hemisphere ENQ have the highest tides when they come into the position b ∞ Q, under the moon; and the lowest tides when the earth's diurnal rotation carries them into the position a TE, on the side opposite to the moon; the reverse happens at the same time in the southern hemisphere ESQ, as is evident to sight. The axis of the tides a C d has now its poles a and d (being always 90 degrees from the highest elevations) in the arctic and antarctic circles; and therefore it is plain, that at these circles there is but one tide of flood, and one of ebb, in the lunar day. For, when the point a revolves half round to b, in 12 lunar hours, it has a tide of flood; but when it comes to the same point a again in 12 hours more, it has the lowest ebb. In seven days afterward, the moon M comes to the equinoctial circle, and is over the equator EQ, when both elevations describe the equator; and in both hemispheres, at equal distances from the equator, the tides are equally high in both parts of the lunar day. The whole phenomena being reversed, when the moon has south declination, to what they were when her declination was north, require no farther description.

In the three last-mentioned figures, the earth is orthographically projected on the plane of the meridian; but, in order to describe a particular phenomenon, we now project it on the plane of the ecliptic. Let HZON (fig. 2.) be the earth and sea, FED the equator, T the tropic of Cancer, C the arctic circle, P the north pole, and the curves 1, 2, 3, &c. 24 meridians or hour-circles, intersecting each other in the poles; AGM is the moon's orbit, S the sun, M the moon, Z the water elevated under the moon, and N the opposite equal elevation. As the lowest parts of the water are

always 90 degrees from the highest, when the moon is in either of the tropics (as at M), the elevation Z is on the tropic of Capricorn, and the opposite elevation N on the tropic of Cancer; the low-water circle HCO touches the polar circles at C; and the high-water circle ETPG goes over the poles at P, and divides every parallel of latitude into two equal segments. In this case, the tides upon every parallel are alternately higher and lower; but they return in equal times: the point T, for example, on the tropic of Cancer (where the depth of the tide is represented by the breadth of the dark shade), has a shallower tide of flood at T, than when it revolves half round from thence to G, according to the order of the numeral figures; but it revolves as soon from G to T as it did from T to G. When the moon is in the equinoctial, the elevations Z and N are transferred to the equator at O and H, and the high and low water circles are got into each other's former places; in which case the tides return in unequal times, but are equally high in both parts of the lunar day: for a place at 1 (under D) revolving as formerly, goes sooner from 1 to 11 (under F) than from 11 to 1, because the parallel it describes is cut into unequal segments by the high-water circle HCO: but the points 1 and 11 being equidistant from the pole of the tides at C, which is directly under the pole of the moon's orbit MGA, the elevations are equally high in both parts of the day.

And thus it appears, that as the tides are governed by the moon, they must turn on the axis of the moon's orbit, which is inclined $23\frac{1}{2}$ degrees to the earth's axis at a mean rate; and therefore the poles of the tides must be so many degrees from the poles of the earth, or in opposite points of the polar circles, going round these circles in every lunar day. It is true, that according to fig. 4. when the moon is vertical to the equator ECQ, the poles of the tides seem to fall in with the poles of the world N and S: but when we consider that FGH is under the moon's orbit, it will appear, that when the moon is over H, in the tropic of Capricorn, the north pole of the tides (which can be no more than 90 degrees from under the moon) must be at C in the arctic circle, not at P the north pole of the earth; and as the moon ascends from H to G in her orbit, the north pole of the tides must shift from c to a in the arctic circle, and the south pole as much in the antarctic.

It is not to be doubted, but that the earth's quick rotation brings the poles of the tides nearer to the poles of the world, than they would be if the earth were at rest and the moon revolved about it only once a month; for otherwise the tides would be more unequal in their heights and times of their returns, than we find they are. But how near the earth's rotation may bring the poles of its axis and those of the tides together, or how far the preceding tides may affect those which follow, so as to make them keep up nearly to the same heights and times of ebbing and flowing, is a problem more fit to be solved by observation than by theory.

Those who have opportunity to make observations, and chuse to satisfy themselves whether the tides are really affected in the above manner by the different positions of the moon, especially as to the unequal times of their returns, may take this general rule for knowing when they ought to be so affected. When the earth's axis inclines to the moon, the northern tides, if

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Tides turn
on the axis
of the
moon's or-
bit.

not retarded in their passage through shoals and channels, nor affected by the winds, ought to be greatest when the moon is above the horizon, least when she is below it; and quite the reverse when the earth's axis declines from her: but in both cases, at equal intervals of time. When the earth's axis inclines sidewise to the moon, both tides are equally high, but they happen at unequal intervals of time. In every lunation the earth's axis inclines once to the moon, once from her, and twice sidewise to her, as it does to the sun every year; because the moon goes round the ecliptic every month, and the sun but once in a year. In summer, the earth's axis inclines towards the moon when new; and therefore the day-tides in the north ought to be highest, and night-tides lowest, about the change: at the full, the reverse. At the quarters, they ought to be equally high, but unequal in their returns; because the earth's axis then inclines sidewise to the moon. In winter, the phenomena are the same at full moon as in summer at new. In autumn, the earth's axis inclines sidewise to the moon when new and full; therefore the tides ought to be equally high and uneven in their returns at these times. At the first quarter, the tides of flood should be least when the moon is above the horizon, greatest when she is below it; and the reverse at her third quarter. In spring, the phenomena of the first quarter answer to those of the third quarter in autumn; and *vice versa*. The nearer any time is to either of these seasons, the more the tides partake of the phenomena of these seasons; and in the middle between any two of them the tides are at a mean state between those of both.

In open seas, the tides rise but to very small heights in proportion to what they do in wide-mouthed rivers, opening in the direction of the stream of tide. For, in channels growing narrower gradually, the water is accumulated by the opposition of the contracting bank: like a gentle wind, little felt on an open plain, but strong and brisk in a street; especially if the wider end of the street be next the plain, and in the way of the wind.

The tides are so retarded in their passage thro' different shoals and channels, and otherwise so variously affected by striking against capes and headlands, that at different places they happen at all distances of the moon from the meridian, consequently at all hours of the lunar day. The tide propagated by the moon in the German ocean, when she is three hours past the meridian, takes 12 hours to come from thence to London bridge; where it arrives by the time that a new tide is raised in the ocean. And therefore, when the moon has north declination, and we should expect the tide at London to be greatest when the moon is above the horizon, we find it is least; and the contrary when she has south declination. At several places it is high-water three hours before the moon comes to the meridian; but that tide which the moon pushes as it were before her, is only the tide opposite to that which was raised by her when she was nine hours past the opposite meridian.

There are no tides in lakes, because they are generally so small, that when the moon is vertical she attracts every part of them alike, and therefore, by rendering all the water equally light, no part of it can be raised higher than another. The Mediterranean and

Baltic seas have very small elevations, because the inlets by which they communicate with the Ocean are so narrow, that they cannot, in so short a time, receive or discharge enough to raise or sink their surfaces sensibly.

Air being lighter than water, and the surface of the atmosphere being nearer to the moon than the surface of the sea, it cannot be doubted that the moon raises much higher tides in the air than in the sea. And therefore many have wondered why the mercury does not sink in the barometer when the moon's action on the particles of air makes them lighter as she passes over the meridian. But we must consider, that as these particles are rendered lighter, a greater number of them is accumulated, until the deficiency of gravity be made up by the height of the column; and then there is an equilibrium, and consequently an equal pressure upon the mercury as before; so that it cannot be affected by the aerial tides. It is very probable, however, that the stars which are seen through an aerial tide of this kind will have their light more refracted than those which are seen through the common depth of the atmosphere; and this may account for the supposed refractions by the lunar atmosphere that have been sometimes observed. See n° 43.

It is generally believed that the moon rises about 50 minutes later every day than on the preceding; but this is true only with regard to places on the equator. In places of considerable latitude there is a remarkable difference, especially in the harvest-time. Here the autumnal full moons rise very soon after sun-set for several evenings together. At the polar circles, where the mild season is of very short duration, the autumnal full moon rises at sun-set from the first to the third quarter. And at the poles, where the sun is for half a year absent, the winter full-moons shine constantly without setting from the first to the third quarter.

All these phenomena are owing to the different angles made by the horizon and different parts of the moon's orbit; and may be explained in the following manner.

The plane of the equinoctial is perpendicular to the earth's axis: and therefore, as the earth turns round its axis, all parts of the equinoctial make equal angles with the horizon both at rising and setting; so that equal portions of it always rise or set in equal times. Consequently, if the moon's motion were equable, and in the equinoctial, at the rate of 12 degrees 11 min. from the sun every day, as it is in her orbit, she would rise and set 50 minutes later every day than on the preceding: for 12 deg. 11 min. of the equinoctial rise or set in 50 minutes of time in all latitudes.

But the moon's motion is so nearly in the ecliptic, that we may consider her at present as moving in it. Now the different parts of the ecliptic, on account of its obliquity to the earth's axis, make very different angles with the horizon as they rise or set. Those parts or signs which rise with the smallest angles set with the greatest, and *vice versa*. In equal times, whenever this angle is least, a greater portion of the ecliptic rises than when the angle is larger; as may be seen by elevating the pole of a globe to any considerable latitude, and then turning it round its axis in the horizon. Consequently, when the moon is in those signs which rise or set with the smallest angles, she rises or sets with the least difference of time; and with

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Why the moon does not affect the barometer.

168
Of the harvest moon.

166
Irregularities of tides accounted for.

PLXLVIII.
fig. 4.

the greatest difference in those signs which rise or set with the greatest angles.

Let FOP be the axis of a globe, \odot TR the tropic of Cancer, Lt $\frac{1}{2}$ the tropic of Capricorn, \odot EU $\frac{1}{2}$ the ecliptic touching both the tropics, which are 47 degrees from each other, and AB the horizon. The equator, being in the middle between the tropics, is cut by the ecliptic in two opposite points, which are the beginnings of Aries and Libra, K is the hour-circle with its index, F the north pole of the globe elevated to a considerable latitude, suppose 40 degrees above the horizon; and P the south pole depressed as much below it. Because of the oblique position of the sphere in this latitude, the ecliptic has the high elevation N \odot above the horizon, making the angle NU \odot of $73\frac{1}{2}$ degrees with it when Cancer is on the meridian, at which time Libra rises in the east. But let the globe be turned half round its axis, till Capricorn comes to the meridian and Aries rises in the east; and then the ecliptic will have the low elevation NL above the horizon, making only an angle NUL of $26\frac{1}{2}$ degrees with it; which is 47 degrees less than the former angle, equal to the distance between the tropics.

In northern latitudes, the smallest angle made by the ecliptic and horizon is when Aries rises, at which time Libra sets; the greatest when Libra rises, at which time Aries sets. From the rising of Aries to the rising of Libra (which is twelve (x) sidereal hours) the angle increases; and from the rising of Libra to the rising of Aries, it decreases in the same proportion. By this article and the preceding, it appears that the ecliptic rises fastest about Aries, and slowest about Libra.

On the parallel of London, as much of the ecliptic rises about Pisces and Aries in two hours as the moon goes through in six days: and therefore, whilst the moon is in these signs, she differs but two hours in rising for six days together; that is, about 20 minutes later every day or night than on the preceding, at a mean rate. But in 14 days afterwards, the moon comes to Virgo and Libra, which are the opposite signs to Pisces and Aries; and then she differs almost four times as much in rising; namely, one hour and about fifteen minutes later every day or night than the former, whilst she is in these signs.

As the moon can never be full but when she is opposite to the sun, and the sun is never in Virgo and Libra but in our autumnal months, it is plain that the moon is never full in the opposite signs, Pisces and Aries, but in these two months. And therefore we can have only two full moons in the year, which rise so near the time of sun-set for a week together, as a-bove-mentioned. The former of these is called the *harvest moon*, and the latter the *hunter's moon*.

Here it will probably be asked, why we never observe this remarkable rising of the moon but in harvest, seeing she is in Pisces and Aries twelve times in the year besides; and must then rise with as little difference of time as in harvest? The answer is plain: for in winter these signs rise at noon; and being then only a quarter of a circle distant from the sun, the moon in them is in

her first quarter: but when the sun is above the horizon, the moon's rising is neither regarded nor perceived. In spring, these signs rise with the sun, because he is then in them; and as the moon changeth in them at that time of the year, she is quite invisible. In summer, they rise about midnight; and the sun being then three signs, or a quarter of a circle, before them, the moon is in them about her third quarter; when rising so late, and giving but very little light, her rising passes unobserved. And in autumn, these signs, being opposite to the sun, rise when he sets, with the moon in opposition, or at the full, which makes her rising very conspicuous.

At the equator, the north and south poles lie in the horizon; and therefore the ecliptic makes the same angle southward with the horizon when Aries rises, as it does northward when Libra rises. Consequently, as the moon rises and sets nearly at equal angles with the horizon all the year round, and about 50 minutes later every day or night than on the preceding, there can be no particular harvest-moon at the equator.

The farther that any place is from the equator, if it be not beyond the polar circle, the more the angle is diminished which the ecliptic and horizon make when Pisces and Aries rise: and therefore when the moon is in these signs, she rises with a nearly proportionable difference later every day than on the former; and is for that reason the more remarkable about the full, until we come to the polar circles, or 66 degrees from the equator; in which latitude the ecliptic and horizon become coincident every day for a moment, at the same sidereal hour (or 3 minutes 56 seconds sooner every day than the former), and the very next moment one half of the ecliptic containing Capricorn, Aquarius, Pisces, Aries, Taurus, and Gemini, rises, and the opposite half sets. Therefore, whilst the moon is going from the beginning of Capricorn to the beginning of Cancer, which is almost 14 days, she rises at the same sidereal hour; and in autumn just at sun-set, because all that half of the ecliptic, in which the sun is at that time, sets at the same sidereal hour, and the opposite half rises; that is, 3 minutes 56 seconds, of mean solar time, sooner every day than on the day before. So whilst the moon is going from Capricorn to Cancer, she rises earlier every day than on the preceding; contrary to what she does at all places between the polar circles. But during the above 14 days, the moon is 24 sidereal hours later in setting; for the six signs which rise all at once on the eastern side of the horizon are 24 hours in setting on the western side of it.

In northern latitudes, the autumnal full moons are in Pisces and Aries, and the vernal full moons in Virgo and Libra; in southern latitudes, just the reverse, because the seasons are contrary. But Virgo and Libra rise at so small angles with the horizon in southern latitudes, as Pisces and Aries do in the northern; and therefore the harvest-moons are just as regular on one side of the equator as on the other.

As these signs, which rise with the least angles, set with the greatest, the vernal full moons differ as much in their times of rising every night as the autumnal full moons

(x) The ecliptic, together with the fixed stars, make 3664 apparent diurnal revolutions about the earth in a year; the sun only 365 $\frac{1}{4}$. Therefore the stars gain 3 minutes 56 seconds upon the sun every day: so that a sidereal day contains only 23 hours 56 minutes of mean solar time; and a natural or solar day 24 hours. Hence 12 sidereal hours are 11 minutes 58 seconds shorter than 12 solar.

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Why the
same phe-
nomenon is
not observed
at other
times.

moons differ in their times of setting; and set with as little difference as the autumnal full moons rise: the one being in all cases the reverse of the other.

Hitherto, for the sake of plainness, we have supposed the moon to move in the ecliptic, from which the sun never deviates. But the orbit in which the moon really moves is different from the ecliptic; one half being elevated $5\frac{1}{2}$ degrees above it, and the other half as much depressed below it. The moon's orbit therefore intersects the ecliptic in two points diametrically opposite to each other; and these intersections are called the *Moon's Nodes*. So the moon can never be in the ecliptic but when she is in either of her nodes, which is at least twice in every course from change to change, and sometimes thrice. For, as the moon goes almost a whole sign more than round her orbit from change to change; if she passes by either node about the time of change, she will pass by the other in about 14 days after, and come round to the former node two days again before the next change. That node from which the moon begins to ascend northward, or above the ecliptic, in northern latitudes, is called the *Ascending Node*; and the other the *Descending Node*, because the moon, when she passes by it, descends below the ecliptic southward.

The moon's oblique motion with regard to the ecliptic causes some difference in the times of her rising and setting from what is already mentioned. For when she is northward of the ecliptic, she rises sooner and sets later than if she moved in the ecliptic: and when she is southward of the ecliptic, she rises later and sets sooner. This difference is variable, even in the same signs, because the nodes shift backward about $19\frac{1}{2}$ degrees in the ecliptic every year; and so go round it contrary to the order of signs in 18 years 225 days.

When the ascending node is in Aries, the southern half of the moon's orbit makes an angle of $5\frac{1}{2}$ degrees less with the horizon than the ecliptic does, when Aries rises in northern latitudes: for which reason the moon rises with less difference of time whilst she is in Pisces and Aries, than she would do if she kept in the ecliptic. But in 9 years and 112 days afterward, the descending node comes to Aries; and then the moon's orbit makes an angle $5\frac{1}{2}$ degrees greater with the horizon when Aries rises, than the ecliptic does at that time; which causes the moon to rise with greater difference of time in Pisces and Aries than if she moved in the ecliptic.

To be a little more particular; when the ascending node is in Aries, the angle is only $9\frac{1}{2}$ degrees on the parallel of London when Aries rises; but when the descending node comes to Aries, the angle is $20\frac{1}{2}$ degrees. This occasions as great a difference of the moon's rising in the same signs every nine years, as there would be on two parallels $10\frac{1}{2}$ degrees from one another, if the moon's course were in the ecliptic.

As there is a complete revolution of the nodes in $18\frac{3}{4}$ years, there must be a regular period of all the varieties which can happen in the rising and setting of the moon during that time. But this shifting of the nodes never affects the moon's rising so much, even in her quickest descending latitude, as not to allow us still the benefit of her rising nearer the time of sun-set for a few days together about the full in harvest, than when she is full at any other time of the year.

At the polar circles, when the sun touches the summer tropic, he continues 24 hours above the horizon; and 24 hours below it, when he touches the winter tropic. For the same reason, the full moon neither rises in summer, nor sets in winter, considering her as moving in the ecliptic. For the winter full moon being as high in the ecliptic as the summer sun, must therefore continue as long above the horizon; and the summer full moon being as low in the ecliptic as the winter sun, can no more rise than he does. But these are only the two full moons which happen about the tropics, for all the others rise and set. In summer, the full moons are low, and their stay is short above the horizon, when the nights are short, and we have least occasion for moon light: in winter they go high, and stay long above the horizon, when the nights are long, and we want the greatest quantity of moon-light.

At the poles, one half of the ecliptic never sets, and the other half never rises: and therefore, as the sun is always half a year in describing one half of the ecliptic, and as long in going through the other half, it is natural to imagine that the sun continues half a year together above the horizon of each pole in its turn, and as long below it; rising to one pole when he sets to the other. This would be exactly the case if there were no refraction: but by the atmosphere's refracting the sun's rays, he becomes visible some days sooner, and continues some days longer in sight, than he would otherwise do: so that he appears above the horizon of either pole before he has got below the horizon of the other. And, as he never goes more than $23\frac{1}{2}$ degrees below the horizon of the poles, they have very little dark night; it being twilight there, as well as at other places, till the sun be 18 degrees below the horizon. The full moon, being always opposite to the sun, can never be seen while the sun is above the horizon, except when she is in the northern half of her orbit; for whenever any point of the ecliptic rises, the opposite point sets. Therefore, as the sun is above the horizon of the north pole from the 20th of March till 23^d of September, it is plain that the moon, when full, being opposite to the sun, must be below the horizon during that half of the year. But when the sun is in the southern half of the ecliptic, he never rises to the north pole; during which half of the year, every full moon happens in some part of the northern half of the ecliptic which never sets. Consequently, as the polar inhabitants never see the full moon in summer, they have her always in the winter, before, at, and after the full, shining for 14 of our days and nights. And when the sun is at his greatest depression below the horizon, being then in Capricorn, the moon is at her first quarter in Aries, full in Cancer, and at her third quarter in Libra. And as the beginning of Aries is the rising point of the ecliptic, Cancer the highest, and Libra the setting point, the moon rises at her first quarter in Aries; is most elevated above the horizon, and full in Cancer; and sets, at the beginning of Libra, in her third quarter, having continued visible for 14 diurnal rotations of the earth. Thus the poles are supplied one half of the winter-time with constant moon-light in the sun's absence; and only lose sight of the moon from her third to her first quarter, while she gives but very little light, and could be but of little and sometimes of no service to them. A bare view of the figure will make this plain:

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Long moon-light in winter at the poles.

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Revolution of the moon's nodes.

Pl. XLVIII.
fig. 3.

plain: in which let S be the sun; e , the earth in summer, when its north pole n inclines toward the sun; and E the earth in winter, when its north pole declines from him. SEN and NWS is the horizon of the north pole, which is coincident with the equator; and, in both these positions of the earth, $\varphi \subseteq \Delta \varphi$ is the moon's orbit, in which she goes round the earth, according to the order of the letters $a b c d$, $A B C D$. When the moon is at a , she is in her third quarter to the earth at e , and just rising to the north pole n ; at b she changes, and is at the greatest height above the horizon, as the sun likewise is; at c she is in her first quarter, setting below the horizon; and is lowest of all under it at d , when opposite to the sun, and her enlightened side toward the earth. But then she is full in view to the south pole p ; which is as much turned from the sun as the north pole inclines toward him. Thus, in our summer, the moon is above the horizon of the north pole whilst she describes the northern half of the ecliptic $\varphi \subseteq \Delta \varphi$, or from her third quarter to her first; and below the horizon during her progress through the southern half $\Delta \varphi \varphi$; highest at the change, most depressed at the full. But in winter, when the earth is at E , and its north pole declines from the sun, the new moon at D is at her greatest depression below the horizon NWS , and the full moon at B at her greatest height above it; rising at her first quarter A , and keeping above the horizon till she comes to her third quarter C . At a mean rate she is $23\frac{1}{2}$ degrees above the horizon at B and b , and as much below it at D and d , equal to the inclination of the earth's axis $F. S \subseteq$, or $S \varphi$, are, as it were, a ray of light proceeding from the sun to the earth; and shews that when the earth is at e , the sun is above the horizon, vertical to the tropic of Cancer; and when the earth is at E , he is below the horizon, vertical to the tropic of Capricorn.

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Horizontal
moon ac-
counted for
by Mr Fer-
guson.

Pl. XLV.
fig. 1.

The sun and moon generally appear larger when near the horizon than when at a distance from it; for which there have been various reasons assigned. The following account is given by Mr Fergulon. "These luminaries, although at great distances from the earth, appear floating as it were on the surface of our atmosphere, HGF/cC, a little way beyond the clouds; of which, those about F , directly over our heads at E , are nearer us than those about H or c in the horizon HEC . Therefore, when the sun or moon appear in the horizon at e , they are not only seen in a part of the sky which is really farther from us than if they were at any considerable altitude, as about f ; but they are also seen through a greater quantity of air and vapours at c than at f . Here we have two concurring appearances which deceive our imagination, and cause us to refer the sun and moon to a greater distance at their rising or setting about c , than when they are considerably high, as at f : first, their seeming to be on a part of the atmosphere at c , which is really farther than f from a spectator at E ; and, secondly, their being seen through a grosser medium when at c than when at f , which, by rendering them dimmer, causes us to imagine them to be at a yet greater distance. And as, in both cases, they are seen much under the same angle, we naturally judgethem to be larger when they seem farthest from us.

"Any one may satisfy himself that the moon appears under no greater angle in the horizon than on the meridian, by taking a large sheet of paper, and rolling it

up in the form of a tube, of such a width, that, observing the moon through it when she rises, she may as it were just fill the tube: then tie a thread round it to keep it of that size; and when the moon comes to the meridian, and appears much less to the eye, look at her again through the same tube, and she will fill it just as much, if not more, than she did at her rising.

"When the full moon is in her perigee, or at her least distance from the earth, she is seen under a larger angle, and must therefore appear bigger than when she is full at other times: And if that part of the atmosphere where she rises be more replete with vapours than usual, she appears so much the dimmer; and therefore we fancy her to be still the bigger, by referring her to an unusually great distance, knowing that no objects which are very far distant can appear big unless they really be so."

To others this solution has appeared unsatisfactory; and accordingly Mr Dunn has given the following dissertation on this phenomenon, Phil. Transf. Vol. LXIV.

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By Mr Dunn

1. "The sun and moon, when they are in or near the horizon, appear to the naked eye of the generality of persons, so very large in comparison with their apparent magnitudes when they are in the zenith, or somewhat elevated, that several learned men have been led to inquire into the cause of this phenomenon; and after endeavouring to find certain reasons, founded on the principles of physics, they have at last pronounced this phenomenon a mere optical illusion.

2. "The principal dissertations which I have seen conducing to give any information on this subject, or helping to throw any light on the same, have been those printed on the transactions of the Royal Society, the Academy of Sciences at Paris, the German Acts, and Dr Smith's Optics; but as all the accounts which I have met with in these writings any way relative to this subject, have not given me that satisfaction which I have desired, curiosity has induced me to inquire after the cause of this singular phenomenon in a manner somewhat different from that which others have done before me, and by such experiments and observations as have appeared to me pertinent; some of which have been as follows, viz.

3. "I have observed the rising and setting sun near the visible horizon, and near rising grounds elevated above the visible horizon about half a degree, and found him to appear largest when near to the visible horizon; and particularly a considerable alteration of his magnitude and light has always appeared to me from the time of his being in the horizon at rising, to the time of his being a degree or two above the horizon, and the contrary at his setting; which property I have endeavoured to receive as a prejudice, and an imposition on my sight and judgement, the usual reasons for this appearance.

4. "I have also observed that the sun near the horizon appears to put on the figure of a spheroid, having its vertical diameter appearing to the naked eye shorter than the horizontal diameter; and, by measuring those diameters in a telescope, have found the vertical one shorter than the other.

5. "I have made frequent observations and comparisons of the apparent magnitude of the sun's disk, with objects directly under him, when he has been near the horizon, and with such objects as I have found by measurement

measurement to be of equal breadth with the sun's diameter; but in the sudden transition of the eye from the sun to the object, and from the object to the sun, have always found the sun to appear least; and that when two right lines have been imaginarily produced by the sides of those equal magnitudes, they have not appeared to keep parallel, but to meet beyond the sun.

6. "From these and other like circumstances, I first began to suspect that a sudden dip of the sun into the horizontal vapours, might some how or other be the cause of a sudden apparent change of magnitude; although the horizontal vapours had been disallowed to be able to produce any other than a refraction in a vertical direction; and, reducing things to calculation, found, that from the time when the sun is within a diameter or two of the horizon, to the time when he is a semidiameter below the horizon, the sun's rays become passable through such a length of medium, reckoning in the direction of the rays, that the total quantity of medium (reckoning both depth and density) through which the rays pass, being compared with the like total depth and density through which they pass at several elevations, it was proportionable to the difference of apparent magnitude, as appearing to the naked eye.

7. "This circumstance of sudden increase and decrease of apparent magnitude, and as sudden decrease and increase of light (for they both go together), seemed to me no improbable cause of the phenomenon, although I could not then perceive how such vapours might contribute toward enlarging the diameter of the sun in a horizontal direction.

8. "I therefore examined the sun's disk again and again, by the naked eye and by telescopes, at different altitudes; and, among several circumstances, found the solar macule to appear larger and plainer to the naked eye, and through a telescope, the sun being near the horizon, than they had appeared the same days when the sun was on the meridian, and to appearance more strongly defined, yet obscured.

9. "A little before sun-setting, I have often seen the edge of the sun with such protuberances and indentures as have rendered him in appearance a very odd figure; the protuberances shooting out far beyond, and the indentures pressing into the disk of the sun; and always, through a telescope magnifying 55 times, the lower limb has appeared with a red glowing arch beneath it, and close to the edge of the sun, while the other parts have been clear.

10. "At sun-setting, these protuberances and indentures have appeared to slide along the vertical limbs, from the lower limb to the higher, and there vanishing, so as often to form a segment of the sun's upper limb, apparently separated from the disk for a small space of time.

11. "At sun-rising I have seen the like protuberances, indentures, and slices, above described; but with this difference of motion, that at sun-rising they first appear to rise in the sun's upper limb, and slide or move downward to the lower limb; or, which is the same thing, they always appear at the rising and setting of the sun, to keep in the same parallels of altitude by the telescope. This property has been many times so discernable, even by the naked eye, that I have observed the sun's upper limb to shoot out towards right and left, and move downwards, forming the upper part of the disk

an apparent portion of a lesser spheroid than the lower part at rising, and the contrary at setting. Through the telescope this has appeared more plain in proportion to the power of magnifying.

12. "These protuberances and indentures so easily measurable by the micrometer, whilst the telescope wires appeared frait, enabled me to conclude, that certain strata of the atmosphere have different refractive powers; and, lying horizontally across the conical or cycloidal space traced out by the rays between the eye and that part of the atmosphere first touched by the rays, must have been the cause of such apparent protuberances and indentures in an horizontal direction across the sun's vertical limbs; and also that the bottoms of those protuberances and indentures must be considerably enlarged, and removed to appearance farther from the centre of the disk than they would have been had there been no such strata to refract.

13. "Before sun-rising, when the sun has been near the tropic; and the sky, at the utmost extent of the horizon, hath appeared very clear; and when certain fogs have appeared in strata placed alternately between the hills, and over intervening rivers, valleys, &c. so as to admit a sight of the rising sun over those fogs; I have observed with admiration, the most distant trees and bushments, which at other times have appeared small to the naked eye, but while the sun has been passing along a little beneath the horizon obliquely under them, just before sun-rising, when the sun has been thus approaching towards trees and bushments, they have grown apparently very large to the naked eye, and also through a telescope; and they have lost that apparent largeness as the sun has been passed by them. Thus a few trees standing together on the rising ground, at the distance of a few miles, have appeared to grow up into an apparent mountain. Such apparent mountains formed from trees put on all forms and shapes, as sloping, perpendicular, over-leaning, &c. but soon recover their natural appearance when the sun is past by them, or got above the horizon.

14. "Mountains themselves, at a distance, sometimes appear larger than at other times. Beasts and cattle in the midst of, and being surrounded with, water, appear nearer to us than when no water surrounds them. Cattle, houses, trees, all objects on the summit of a hill, when seen through a fog, and at a proper distance, appear enlarged. All bodies admit of larger apparent magnitudes when seen through some mediums than others.

"But more particularly,

15. "I took a cylindrical glass vessel about two feet high; and having graduated its sides to inches, I placed it upright on a table, with a piece of paper under the bottom of the glass, on which paper were drawn parallel right lines at proper distances from each other; and having placed a shilling at the bottom of the vessel, it was nearly as low as the paper. Pouring water into the vessel, and viewing the shilling through the medium of water with one eye, whilst I beheld with the other eye where the edges of the shilling were projected on the paper and its parallels, I found the shilling appear larger at every additional inch depth of the water; and this was the case if either eye was used; and the same when the eye was removed far from the surface or near to it, or in any proportion thereto.

16. "I took large vessels; and, filling them with water, placed different bodies at the bottoms of those vessels. It always followed, that the greater depth of water I looked through, in the direction from my eye to the objects in the water, the nearer those objects appeared to me. Thus light bodies appeared more mellow and faint, and dark bodies rather better defined, than out of the water, when they were not deeply immersed. And thus they appeared under whatever directions or positions I viewed the bodies.

17. "I placed different bodies in proper vessels of fair water, and immersed my face in the water; viewing the bodies in and through the water. They all appeared to me plain, when not too far from the eye; and altho' a little hazy at the edges, they appeared much enlarged, and always larger through a greater depth of water. Thus a shilling appeared nearly as large as half a crown, with a red glowing arch on that side opposite to the sun, when the sun shined on the water. From this experiment I concluded, that divers fee light objects not only larger, but very differently, in the water."

From these experiments he draws a confirmation of his doctrine, that the appearances treated of arise from the different strata of the atmosphere; and then concludes, that the rays coming from the sun are by the horizontal vapours "first obstructed, and many of them totally absorbed; the rest proceeding with a retarded motion, are thereby first reflected, and then less refracted through the humours of the eye; and lastly, that hereby the image on the retina becomes enlarged."

Sect. VII. *Of drawing a Meridian Line. Of Solar and Sidereal Time, and of the Equation of Time.*

THE foundation of all astronomical observations is a knowledge of the exact time when the sun, or any other of the celestial bodies, comes to the meridian; and therefore astronomers have been very attentive to the most proper methods of drawing a meridian line, by which only this can be exactly known. The easiest method of doing this is the following, recommended by Mr Ferguson.

Make four or five concentric circles, about a quarter of an inch from one another, on a flat board about a foot in breadth; and let the outmost circle be but little less than the board will contain. Fix a pin perpendicularly in the centre, and of such a length that its whole shadow may fall within the innermost circle for at least four hours in the middle of the day. The pin ought to be about an eighth part of an inch thick, and to have a round blunt point. The board being set exactly level in a place where the sun shines, suppose from eight in the morning till four in the afternoon, about which hours the end of the shadow should fall without all the circles; watch the times in the forenoon when the extremity of the shortening shadow just touches the several circles, and there make marks. Then, in the afternoon of the same day, watch the lengthening shadow; and where its end touches the several circles in going over them, make marks also. Lastly, with a pair of compasses, find exactly the middle point between the two marks on any circle, and draw a straight line from the centre to that point; which line will be covered at noon by the shadow of a small upright wire,

which should be put in the place of the pin. The reason for drawing several circles is, that in case one part of the day should prove clear, and the other part somewhat cloudy, if you miss the time when the point of the shadow should touch one circle, you may perhaps catch it in touching another. The best time for drawing a meridian line in this manner is about the summer solstice; because the sun changes his declination slowest, and his altitude fastest, in the longest days.

If the casement of a window on which the sun shines at noon be quite upright, you may draw a line along the edge of its shadow on the floor, when the shadow of the pin is exactly on the meridian line of the board; and as the motion of the shadow of the casement will be much more sensible on the floor than that of the shadow of the pin on the board, you may know to a few seconds when it touches the meridian line on the floor.

This method may suffice for ordinary purposes, but for astronomers the following is preferable. Take the gnomon of an horizontal dial for the latitude of the place, and to the hypotenusa fix two sights, whose centres may be parallel to the fame: let the eye-sight be a small hole, but the other's diameter must be equal to the tangent of the double distance of the north-star from the pole; the distance of the sights being made radius, let the stile be rivetted to the end of a straight ruler; then when you would make use of it, lay the ruler on an horizontal plane, so that the end to which the stile is fixed may overhang; then look through the eye-sight, moving the instrument till the north-star appears to touch the circumference of the hole in the other sight, on the same hand with the girdle of Cassiopeia, or on the opposite side to that whereon the star in the Great Bear's rump is at that time; then draw a line by the edge of the ruler, and it will be a true meridian line.

A meridian line being by either of these methods exactly drawn, the time when the sun or any other of the celestial bodies is exactly in the meridian may be found by a common quadrant, placing the edge of it along the line, and observing when the sun or other luminary can be seen exactly through its two sights, and noting exactly the time; which, supposing the luminary viewed to be the sun, will be exactly noon, or 12 o'clock; but as the apparent diameter of the sun is pretty large, it ought to be known exactly when his centre is in the meridian, which will be some short space after his western limb has arrived at it, and before his eastern limb comes thither. It will be proper, therefore, to observe exactly the time of the two limbs being seen through the sights of the quadrant; and the half of the difference between these times added to the one, or subtracted from the other, will give the exact time when the sun's centre is in the meridian. What we say with regard to the sun, is also applicable to the moon; but not to the stars, which have no sensible diameter. To render this more intelligible, the following short description of the quadrant, and method of taking the altitudes of celestial bodies by it, is subjoined.

In Plate XLIX. let HOX be a horizontal line, supposed to be extended from the eye at A to X, where the sky and earth seem to meet at the end of a long and level plain; and let S be the sun. The arc XY will be the sun's height above the horizon at X, and is found by the instrument EDC, which is a quadrantal board, or plate of metal, divided into 90 equal parts

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Another
from the
Phil. Trans.

176
To find the
exact time
of noon.

Fig. 6.
177
To take the
altitudes of
the celestial
bodies.

174
Ferguson's
method of
drawing a
meridian
line.

or degrees on its limb DPC ; and has a couple of little brass plates, as a and b , with a small hole in each of them, called *sight-holes*, for looking through, parallel to the edge of the quadrant whereon they stand. To the centre E is fixed one end of a thread F , called the *plumb-line*, which has a small weight or plummet P fixed to its other end. Now, if an observer holds the quadrant upright, without inclining it to either side, and so that the horizon at X is seen through the sight-holes a and b , the plumb-line will cut or hang over the beginning of the degrees at o , in the edge EC : but if he elevates the quadrant so as to look through the sight-holes at any part of the heavens, suppose to the sun at S ; just so many degrees as he elevates the sight-hole b above the horizontal line HOX , so many degrees will the plumb-line cut in the limb CP of the quadrant. For, let the observer's eye at A be in the centre of the celestial arc XYV (and he may be said to be in the centre of the sun's apparent and diurnal orbit, let him be on what part of the earth he will), in which arc the sun is at that time, suppose 25 degrees high, and let the observer hold the quadrant so that he may see the sun through the sight-holes; the plumb-line freely playing on the quadrant will cut the 25th degree in the limb CP , equal to the number of degrees of the sun's altitude at the time of observation. ($N. B.$ Whoever looks at the sun, must have a smoked glass before his eyes, to save them from hurt. The better way is, not to look at the sun through the sight-holes, but to hold the quadrant facing the eye, at a little distance, and so that, the sun shining through one hole, the ray may be seen to fall on the other.)

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Difference
between so-
lar and si-
deral days.

By observations made in the manner above directed, it is found, that the stars appear to go round the earth in 23 hours 56 minutes 4 seconds, and the sun in 24 hours: so that the stars gain three minutes 56 seconds upon the sun every day, which amounts to one diurnal revolution in a year; and therefore, in 365 days as measured by the returns of the sun to the meridian, there are 366 days as measured by the stars returning to it: the former are called *solar days*, and the latter *sidereal*.

If the earth had only a diurnal motion, without an annual, any given meridian would revolve from the sun to the sun again in the same quantity of time as from any star to the same star again; because the sun would never change his place with respect to the stars. But, as the earth advances almost a degree eastward in its orbit in the time that it turns eastward round its axis, whatever star passes over the meridian on any day with the sun, will pass over the same meridian on the next day when the sun is almost a degree short of it; that is, 3 minutes 56 seconds sooner. If the year contained only 360 days, as the ecliptic does 360 degrees, the sun's apparent place, so far as his motion is equal, would change a degree every day; and then the sidereal days would be just 4 minutes shorter than the solar.

PL. XLVI.
fig. 3. Let $ABCDEFGHIKLM$ be the earth's orbit, in which it goes round the sun every year, according to the order of the letters, that is, from west to east; and turns round its axis in the same way from the sun to the sun again in every 24 hours. Let S be the sun, and R a fixed star at such an immense distance, that the diameter of the earth's orbit bears no sensible proportion to that distance. Let Nm be any particular

meridian of the earth, and N a given point or place upon that meridian when the earth is at A , the sun S hides the star R , which would always be hid if the earth never removed from A ; and consequently, as the earth turns round its axis, the point N would always come round to the sun and star at the same time. But when the earth has advanced, suppose a twelfth part of its orbit, from A to B , its motion round its axis will bring the point N a twelfth part of a natural day, or two hours, sooner to the star than to the sun; for the angle of NBn is equal to the angle ASB ; and therefore any star, which comes to the meridian at noon with the sun when the earth is at A , will come to the meridian at 10 in the forenoon when the earth is at B . When the earth comes to C , the point N will have the star on its meridian at 8 in the morning, or four hours sooner than it comes round to the sun; for it must revolve from N to n , before it has the sun in its meridian. When the earth comes to D , the point N will have the star on its meridian at 6 in the morning; but that point must revolve six hours more from N to n , before it has mid-day by the sun: for now the angle ASD is a right angle, and so is NDn ; that is, the earth has advanced 90 degrees in its orbit, and must turn 90 degrees on its axis to carry the point N from the star to the sun: for the star always comes to the meridian when Nm is parallel to RSA ; because DS is but a point in respect of RS . When the earth is at E , the star comes to the meridian at 4 in the morning; at F , at two in the morning; and at G , the earth having gone half round its orbit, N points to the star R at midnight, it being then directly opposite to the sun; and therefore, by the earth's diurnal motion, the star comes to the meridian 12 hours before the sun. When the earth is at H , the star comes to the meridian at 10 in the evening; at I , it comes to the meridian at 8, that is, 16 hours before the sun; at K , 18 hours before him; at L , 20 hours; at M , 22; and at A , equally with the sun again.

Thus it is plain, that an absolute turn of the earth on its axis (which is always completed when any particular meridian comes to be parallel to its situation at any time of the day before) never brings the same meridian round from the sun to the sun again; but that the earth requires as much more than one turn on its axis to finish a natural day, as it has gone forward in that time; which, at a mean state, is a 365th part of a circle. Hence, in 365 days, the earth turns 366 times round its axis; and therefore, as a turn of the earth on its axis completes a sidereal day, there must be one sidereal day more in a year than the number of solar days, be the number what it will, on the earth or any other planet. One turn being lost with respect to the number of solar days in a year, by the planet's going round the sun; just as it would be lost to a traveller, who, in going round the earth, would lose one day by following the apparent diurnal motion of the sun; and consequently would reckon one day less at his return (let him take what time he would to go round the earth) than those who remained all the while at the place from which he set out. So, if there were two earths revolving equally on their axes, and if one remained at A until the other had gone round the sun from A to A again, that earth which kept its place at A would have its solar and sidereal days always of the same

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Sidereal
year con-
tains 366
days.

5 I 2 length;

length; and so would have one solar day more than the other at its return. Hence, if the earth turned but once round its axis in a year, and if that turn was made the same way as the earth goes round the sun, there would be continual day on one side of the earth, and continual night on the other.

180
Inequality
of solar
time.

The earth's motion on its axis being perfectly uniform, and equal at all times of the year, the sidereal days are always precisely of an equal length; and so would the solar or natural days be, if the earth's orbit were a perfect circle, and its axis perpendicular to its orbit. But the earth's diurnal motion on an inclined axis, and its annual motion in an elliptic orbit, cause the sun's apparent motion in the heavens to be unequal: for sometimes he revolves from the meridian to the meridian again in somewhat less than 24 hours, shewn by a well-regulated clock; and at other times in somewhat more: so that the time shewn by an equal going clock and a true sun-dial is never the same but on the 15th of April, the 16th of June, the 31st of August, and the 24th of December. The clock, if he goes equally, and true all the year round, will be before the sun from the 24th of December till the 15th of April; from that time till the 16th of June, the sun will be before the clock; from the 16th of June till the 31st of August, the clock will be again before the sun; and from thence to the 24th of December, the sun will be faster than the clock.

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Equation of
time explained.

As the equation of time, or difference between the time shewn by a well-regulated clock and a true sun-dial, depends upon two causes, namely, the obliquity of the ecliptic, and the unequal motion of the earth in it, we shall first explain the effects of these causes separately considered, and then the united effects resulting from their combination.

The earth's motion on its axis being perfectly equable, or always at the same rate, and the plane of the equator being perpendicular to its axis, it is evident that in equal times equal portions of the equator pass over the meridian; and so would equal portions of the ecliptic, if it were parallel to, or coincident with, the equator. But, as the ecliptic is oblique to the equator, the equable motion of the earth carries unequal portions of the ecliptic over the meridian in equal times, the difference being proportionate to the obliquity; and as some parts of the ecliptic are much more oblique than others, those differences are unequal among themselves. Therefore, if two suns should start from the beginning either of Aries or Libra, and continue to move through equal arcs in equal times, one in the equator, and the other in the ecliptic, the equatorial sun would always return to the meridian in 24 hours time, as measured by a well regulated clock; but the sun in the ecliptic would return to the meridian sometimes sooner and sometimes later than the equatorial sun; and only at the same moments with him on four days of the year; namely, the 20th of March, when the sun enters Aries; the 21st of June, when he enters Cancer; the 23^d of September, when he enters Libra; and the 21st of December, when he enters Capricorn; and to this fictitious sun the motion of a well regulated clock always answers.

Pl. XLVI.
fig. 4.

Let $Z\varphi z$ be the earth; $ZFRz$, its axis; $abcde$, &c. the equator; $ABCDE$, &c. the northern half of the ecliptic from φ to Ω of the side of the globe next

the eye; and $MNOP$, &c. the southern half on the opposite side from Ω to φ . Let the points at A, B, C, D, E, F , &c. quite round from φ to φ again bound equal portions of the ecliptic, gone through in equal times by the real sun; and those at a, b, c, d, e, f , &c. equal portions of the equator described in equal times by the fictitious sun; and let $Z\varphi z$ be the meridian.

As the real sun moves obliquely in the ecliptic, and the fictitious sun directly in the equator, with respect to the meridian; a degree, or any number of degrees, between φ and F on the ecliptic, must be nearer the meridian $Z\varphi z$, than a degree, or any corresponding number of degrees, on the equator from φ to f ; and the more so, as they are the more oblique: and therefore the true sun comes sooner to the meridian every day whilst he is in the quadrant φF , than the fictitious sun does in the quadrant φf ; for which reason, the solar noon precedes noon by the clock, until the real sun comes to F , and the fictitious to f ; which two points, being equidistant from the meridian, both suns will come to it precisely at noon by the clock.

Whilst the real sun describes the second quadrant of the ecliptic $FGHIKL$ from Cancer to Ω , he comes later to the meridian every day, than the fictitious sun moving through the second quadrant of the equator from f to Ω ; for the points at G, H, I, K , and L , being farther from the meridian, their corresponding points at g, h, i , and l , must be later of coming to it: and as both suns come at the same moment to the point Ω , they come to the meridian at the moment of noon by the clock.

In departing from Libra, through the third quadrant, the real sun going through $MNOPQ$ towards φ at R , and the fictitious sun through $mnopq$ towards r , the former comes to the meridian every day sooner than the latter, until the real sun comes to φ , and the fictitious to r , and then they both come to the meridian at the same time.

Lastly, as the real sun moves equally thro' $STUVW$, from φ towards φ ; and the fictitious sun thro' $stuvw$, from r towards φ , the former comes later every day to the meridian than the latter, until they both arrive at the point φ , and then they make it noon at the same time with the clock.

Having explained one cause of the difference of time shewn by a well-regulated clock and a true sun-dial, and considered the sun, not the earth, as moving in the ecliptic; we now proceed to explain the other cause of this difference, namely, the inequality of the sun's apparent motion, which is slowest in summer, when the sun is farthest from the earth, and swiftest in winter when he is nearest to it. But the earth's motion on its axis is equable all the year round, and is performed from west to east; which is the way that the sun appears to change his place in the ecliptic.

If the sun's motion were equable in the ecliptic, the whole difference between the equal time as shewn by the clock, and the unequal time as shewn by the sun, would arise from the obliquity of the ecliptic. But the sun's motion sometimes exceeds a degree in 24 hours, though generally it is less: and when his motion is slowest, any particular meridian will revolve sooner to him than when his motion is quickest; for it will overtake him in less time when he advances a less space than when

when he moves through a larger.

Now, if there were two suns moving in the plane of the ecliptic, so as to go round it in a year; the one describing an equal arc every 24 hours, and the other describing sometimes a less arc in 24 hours, and at other times a larger, gaining at one time of the year what it lost at the opposite; it is evident, that either of these suns would come sooner or later to the meridian than the other; as it happened to be behind or before the other; and when they were both in conjunction, they would come to the meridian at the same moment.

PL XLVII.
fig. 1.

As the real sun moves unequally in the ecliptic, let us suppose a fictitious sun to move equally in a circle coincident with the plane of the ecliptic. Let ABCD be the ecliptic or orbit in which the real sun moves, and the dotted circle *abcd* the imaginary orbit of the fictitious sun; each going round in a year according to the order of letters, or from west to east. Let HIKL be the earth turning round its axis the same way every 24 hours; and suppose both suns to start from A and *a*, in a right line with the plane of the meridian EH, at the same moment: the real sun at A, being then at his greatest distance from the earth, at which time his motion is slowest; and the fictitious sun at *a*, whose motion is always equable, because his distance from the earth is supposed to be always the same. In the time that the meridian revolves from H to H again, according to the order of the letters HIKL, the real sun has moved from A to F; and the fictitious with a quicker motion from *a* to *f*, thro' a large arc: therefore, the meridian EH will revolve sooner from H to *b* under the real sun at F, than from H to *l* under the fictitious sun at *f*; and consequently it will then be noon by the sundial sooner than by the clock.

As the real sun moves from A towards C, the swiftness of his motion increases all the way to C, where it is at the quickest. But notwithstanding this, the fictitious sun gains so much upon the real, soon after his departing from A, that the increasing velocity of the real sun does not bring him up with the equally moving fictitious sun till the former comes to C, and the latter to *c*, when each has gone half round its respective orbit; and then being in conjunction, the meridian EH, revolving to EK, comes to both suns at the same time, and therefore it is noon by them both at the same moment.

But the increased velocity of the real sun, now being at the quickest, carries him before the fictitious one; and therefore, the same meridian will come to the fictitious sun sooner than to the real: for whilst the fictitious sun moves from *c* to *g*, the real sun moves thro' a greater arc from C to G; consequently the point K has its noon by the clock when it comes to *k*, but not its noon by the sun till it comes to *l*. And although the velocity of the real sun diminishes all the way from C to A, and the fictitious sun by an equable motion is still coming nearer to the real sun, yet they are not in conjunction till the one comes to A and the other to *a*, and then it is noon by them both at the same moment.

Thus it appears, that the solar noon is always later than noon by the clock whilst the sun goes from C to A; sooner, whilst he goes from A to C; and at these two points the sun and clock being equal, it is noon by them both at the same moment.

The point A is called the sun's *apogee*, because

when he is there he is at his greatest distance from the earth; the point C his *perigee*, because when in it he is at his least distance from the earth: and a right line, as AEC, drawn through the earth's centre, from one of the points to the other, is called the *line of the Apocides*.

The distance that the sun has gone in any time from his apogee (not the distance he has to go to it, though ever so little) is called his *mean anomaly*, and is reckoned in signs and degrees, allowing 30 degrees to a sign. Thus, when the sun has gone suppose 174 degrees from his apogee at A, he is said to be 5 signs 14 degrees from it, which is his mean anomaly; and when he is gone suppose 355 degrees from his apogee, he is said to be 11 signs 25 degrees from it, although he be but 5 degrees short of A in coming round to it again.

From what was said above, it appears, that when the sun's anomaly is less than 6 signs, that is, when he is any where between A and C, in the half ABC of his orbit, the solar noon precedes the clock noon; but when his anomaly is more than 6 signs, that is, when he is any where between C and A, in the half CDA of his orbit, the clock noon precedes the solar. When his anomaly is 0 signs 0 degrees, that is, when he is in his apogee at A; or 6 signs 0 degrees, which is when he is in his perigee at C; he comes to the meridian at the moment that the fictitious sun does, and then it is noon by them both at the same instant.

SECT. VIII. Of calculating the Distances, Magnitudes, &c. of the Sun, Moon, and Planets.

THIS is accomplished by finding out the horizontal parallax of the body whose distance you desire to know; that is, the angle under which the semidiameter of the body would appear provided we could see it from that earth: and this is to be found out in the following manner.

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To find the moon's horizontal parallax.

Let BAG be one half of the earth, A C its semidiameter, S the sun, *m* the moon, and EKOL a quarter of the circle described by the moon in revolving from the meridian to the meridian again. Let CRS be the rational horizon of an observer at A, extended to the sun in the heavens; and HAO, his sensible horizon extended to the moon's orbit. ALC is the angle under which the earth's semidiameter AC is seen from the moon at L; which is equal to the angle OAL, because the right lines AO and CL which include both these angles are parallel. ASC is the angle under which the earth's semidiameter AC is seen from the sun at S; and is equal to the angle OAL, because the lines AO and CRS are parallel. Now, it is found by observation, that the angle OAL is much greater than the angle OAF; but OAL is equal to ALC, and OAF is equal to ASC. Now as ASC is much less than ALC, it proves that the earth's semidiameter AC appears much greater as seen from the moon at L than from the sun at S; and therefore the earth is much farther from the sun than from the moon. The quantities of these angles may be determined by observation in the following manner.

Let a graduated instrument, as DAE (the larger the better), having a moveable index with sight-holes, be fixed in such a manner, that its plane surface may be parallel to the plane of the equator, and its edge

AD

AD in the meridian: so that when the moon is in the equinoctial, and on the meridian ADE, she may be seen through the sight-holes when the edge of the moveable index cuts the beginning of the divisions at o, on the graduated limb DE; and when she is so seen, let the precise time be noted. Now as the moon revolves about the earth from the meridian to the meridian again in about 24 hours 48 minutes, she will go a fourth part round it in a fourth part of that time, viz. in 6 hours 12 minutes, as seen from C, that is, from the earth's centre or pole. But as seen from A, the observer's place on the earth's surface, the moon will seem to have gone a quarter round the earth when she comes to the sensible horizon at O; for the index through the sights of which she is then viewed will be at d, 90 degrees from D, where it was when she was seen at E. Now let the exact moment when the moon is seen at O (which will be when she is in or near the sensible horizon) be carefully noted (o), that it may be known in what time she has gone from E to O; which time subtracted from six hours 12 minutes (the time of her going from E to L) leaves the time of her going from O to L, and affords an easy method for finding the angle OAL, (called the moon's horizontal parallax, which is equal to the angle ALC) by the following analogy: As the time of the moon's describing the arc EO is to 90 degrees, so is six hours 12 minutes to the degrees of the arc DdE, which measures the angle EAL; from which subtract 90 degrees, and there remains the angle OAL, equal to the angle ALC, under which the earth's semidiameter AC is seen from the moon. Now, since all the angles of a right-lined triangle are equal to 180 degrees, or to two right angles, and the sides of a triangle are always proportional to the sines of the opposite angles, say, by the Rule of Three, As the sine of the angle ALC at the moon L, is to its opposite side AC the earth's semidiameter, which is known to be 3985 miles; so is radius, viz. the sine of 90 degrees, or of the right angle ACL, to its opposite side AL, which is the moon's distance at L from the observer's place at A on the earth's surface; or, so is the sine of the angle CAL to its opposite side CL, which is the moon's distance from the earth's centre, and comes out at a mean rate to be 240,000 miles. The angle CAL is equal to what OAL wants of 90 degrees.

Other methods have been fallen upon for determining the moon's parallax, of which the following is recommended as the best, by Mr Ferguson, tho' hitherto it has not been put in practice. "Let two observers be placed under the same meridian, one in the northern hemisphere, and the other in the southern, at such a distance from each other, that the arc of the celestial meridian included between their two zeniths may be at least 80 or 90 degrees. Let each observer take the distance of the moon's centre from his zenith, by means of an exceeding good instrument, at the moment of her passing the meridian: add these two zenith-distances of the moon together, and their excess above the distance between the two zeniths will be the distance between the two apparent places of the moon. Then, as the sum of the natural sines of the two zenith-distances of the moon is to radius, so is the distance be-

tween her two apparent places to her horizontal parallax: which being found, her distance from the earth's centre may be found by the analogy mentioned above.

Thus, in fig. 1. (2^d Plate L.) let VECQ be the earth, M the moon, and Zbz an arc of the celestial meridian. Let V be Vienna, whose latitude EV is 48° 20' north; and C the Cape of Good Hope, whose latitude EC is 34° 30' south: both which latitudes we suppose to be accurately determined before-hand by the observers. As these two places are on the same meridian VECz, and in different hemispheres, the sum of their latitudes 82° 50' is their distance from each other. Z is the zenith of Vienna, and z the zenith of the Cape of Good Hope; which two zeniths are also 82° 50' distant from each other, in the common celestial meridian Zz. To the observer at Vienna, the moon's centre will appear at a in the celestial meridian; and at the same instant, to the observer at the Cape, it will appear at b. Now suppose the moon's distance Za from the zenith of Vienna to be 38° 1' 53", and her distance zb from the zenith of the Cape of Good Hope to be 46° 4' 41": the sum of these two zenith-distances (Za+zb) is 84° 6' 34"; from which subtract 82° 50", the distance of Z: between the zeniths of these two places, and there will remain 1° 16' 34" for the arc ba, or distance between the two apparent places of the moon's centre, as seen from V and from C. Then, supposing the tabular radius to be 10,000,000, the natural sine of 38° 1' 53" (the arc Za) is 6,160,816, and the natural sine of 46° 4' 41" (the arc zb) is 7,202,821: the sum of both these sines is 13,363,637. Say therefore, As 13,363,637 is to 10,000,000, so is 1° 16' 34" to 57' 18" which is the moon's horizontal parallax.

If the two places of observation be not exactly under the same meridian, their difference of longitude must be accurately taken, that proper allowance may be made for the moon's declination whilst she is passing from the meridian of the one to the meridian of the other.

The parallax, and consequently the distance and bulk, of any primary planet, might be found in the above manner, if the planet was near enough to the earth, so as to make the difference of its two apparent places sufficiently sensible: but the nearest planet is too remote for the accuracy required.

The sun's distance from the earth might be found the same way, though with more difficulty, if his horizontal parallax, or the angle OAS equal to the angle ASC, were not so small as to be hardly perceptible, being found in this way to be scarce 10 seconds of a minute, or the 360th part of a degree. Hence all astronomers both ancient and modern have failed in taking the sun's parallax to a sufficient degree of exactness; but as some of the methods used are very ingenious, and shew the great acuteness and sagacity of the ancient astronomers, we shall here give an account of them. The first method was invented by Hipparchus; and has been made use of by Ptolemy and his followers, and many other astronomers. It depends on an observation of an eclipse of the moon: And the principles on which it is founded are, 1st, In a lunar eclipse, the horizontal parallax of the sun is equal to the difference between the apparent semidiameter of the sun,

(o) Here proper allowance must be made for the refraction, which being about 34 minutes of a degree in the horizon, will cause the moon's centre to appear 34 minutes above the horizon when her centre is really in it.

6th Plate
XLII. fig. 3.

fun, and half the angle of the conical shadow; which is easily made out in this manner. Let the circle AFG represent the fun, and DHE the earth; let DHM be the shadow, and DMC the half angle of the cone. Draw from the centre of the fun the right line SD touching the earth, and the angle DSC is the apparent semidiameter of the earth, seen from the fun, which is equal to the horizontal parallax of the fun; and the angle ADS is the apparent semidiameter of the fun, seen from the earth: The external angle ADS is equal to the two internals DMS and DSM, by the 32^d Prop. Elem. I. And therefore the angle DSM, or DSC, is equal to the difference of the angles ADS and DMS. 2dly, Half the angle of the cone is equal to the difference of the horizontal parallax of the moon, and the apparent semidiameter of the shadow, seen from the earth at the distance of the moon. For let CDE be the earth, CME the shadow, which at the distance of the moon being cut by a plane, the section will be the circle FLH, whose semidiameter is FG, and is seen from the centre of the earth under the angle FTG. But by the 32^d Prop. Elem. I. the angle CFT is equal to the two internals FMT and FTM. Wherefore the angle FMT is the difference of the two angles CFT and GTF: But the angle CFT is the angle under which the semidiameter of the earth is seen from the moon, and this is equal to the horizontal parallax of the moon; and the angle GTF is the apparent semidiameter of the shadow seen from the earth's centre. It is therefore evident that the half angle of the cone is equal to the difference of the horizontal parallax of the moon, and the apparent semidiameter of the shadow seen from the earth. Wherefore, if to the apparent semidiameter of the fun there be added the apparent semidiameter of the shadow, and from the sum you take away the horizontal parallax of the moon, there will remain the horizontal parallax of the fun; which therefore, if these were accurately known, would be likewise known accurately: But none of them can be so exactly and nicely obtained, as to be sufficient for determining the parallax of the fun; for very small errors, which cannot be easily avoided in measuring these angles, will produce very great errors in the parallax; and there will be a prodigious difference in the distances of the fun, when drawn from these parallaxes. For example: Suppose the horizontal parallax of the moon to be 60' 15", the semidiameter of the fun 16', and the semidiameter of the shadow 44' 30"; we shall conclude from thence, that the parallax of the fun was 15", and his distance from the earth about 13,700 semidiameters of the earth. But if there be an error committed, in determining the semidiameter of the shadow, of 12" in defect (and certainly the semidiameter of the shadow cannot be had so precisely as not to be liable to such an error), that is, if instead of 44' 30" we put 44' 18" for the apparent diameter of the shadow, all the others remaining as before, we shall have the parallax of the fun 3", and its distance from the earth almost 70,000 semidiameters of the earth, which is five times more than what it was by the first position. But if the fault were in excess, or the diameter of the shadow exceeded the true by 12", so that we should put in 44' 42" the parallax would arise to 27", and the distance of the fun only 7700 of the earth's semidiameters; which is nine times less than what it comes to by a like error

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This method insufficient.

in defect. If an error in defect was committed of 15", which is still but a small mistake, the fun's parallax would be equal to nothing, and his distance infinite. Wherefore, since from so small mistakes the parallax and distance of the fun vary so much, it is plain that the distance of the fun cannot be obtained by this method.

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Aristarchus's method.

Since, therefore, the angle that the earth's semidiameter subtends at the sun is so small, that it cannot be determined by any observation, Aristarchus Samius, an ancient and great philosopher and astronomer, contrived a very ingenious way for finding the angle which the semidiameter of the moon's orbit subtends when seen from the sun: This angle is about 60 times bigger than the former, subtended only by the earth's semidiameter. To find this angle, he lays down the following principles.

From the phases of the moon, it hath been demonstrated, that if a plane passed through the moon's centre, to which the line joining the sun and moon's centre was perpendicular, this plane would divide the illuminated hemisphere of the moon from the dark one: And therefore, if this plane should likewise pass through the eye of a spectator on the earth, the moon would appear bisected, or like a half circle; and a right line, drawn from the earth to the centre of the moon, would be in the plane of illumination, and consequently would be perpendicular to the right line which joins the centres of the sun and moon. Let S be the sun, and T the earth, AL a quadrant of the moon's orbit; and let the line SL, drawn from the sun, touch the orbit of the moon in L; the angle TLS will be a right angle: And therefore, when the moon is seen in L, it will appear bisected, or just half a circle. At the same time take the angle LTS, the elongation of the moon from the sun, and then we shall have the angle LST, its complement to a right angle. But we have the side TL, by which we can find the side ST, the distance of the sun from the earth.

6th Plate
XLIII. fig. 4.

But the difficult point is to determine exactly the moment of time when the moon is bisected, or in its true dichotomy; for there is a considerable space of time both before and after the dichotomy, nay even in the quadrature, when the moon will appear bisected, or half a circle; so that the exact moment of bisection cannot be known by observation, as experience tells us: And consequently, the true distance of the sun from the earth cannot be obtained by this method.

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This method insufficient.

Since the moment in which the true dichotomy happens is uncertain, but it is certain that it happens before the quadrature; Ricciolus takes that point of time which is in the middle, between the time that the phasis begins to be doubtful whether it be bisected or not, and the time of quadrature: but he had done better, if he had taken the middle point between the time when it becomes doubtful whether the moon's side is concave or straight, and the time again when it is doubtful whether it is straight or convex; which point of time is after the quadrature: and if he had done this, he would have found the sun's distance a great deal more than he has made it.

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Ricciolus's method.

There is no need to confine this method to the phasis of a dichotomy or bisection, for it can be as well performed when the moon has any other phasis bigger or less than a dichotomy: for observe by a very good telescope,

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Another by Dr Keil.

telescope, with a micrometer, she phasis of the moon, that is, the proportion of the illuminated part of the diameter to the whole; and at the same moment of time take her elongation from the sun: The illuminated part of the diameter, if it be less than the semidiameter, is to be subducted from the semidiameter; but if it be greater, the semidiameter is to be subducted from it, and mark the residue: then say, As the semidiameter of the moon is to the residue, so is the radius to the sine of an angle, which is therefore found: this angle added to, or subtracted from, a right angle, gives the exterior angle of the triangle at the moon: but we have the angle at the earth, which is the elongation observed; which therefore being subducted from the exterior angle, leaves the angle at the sun. And in the triangle SLT, having all the angles and one side LT, we can find the other side ST, the distance of the sun from the earth. But it is almost impossible to determine accurately the quantity of the lunar phasis, so that there may not be an error of a few seconds committed; and consequently, we cannot by this method find precisely enough the true distance of the sun. However, from such observations, we are sure, that the sun is above 7000 semidiameters of the earth distant from us. Since therefore the true distance of the sun can neither be found by eclipses, nor by the phases of the moon, the astronomers are forced to have recourse to the parallaxes of the planets that are next to us, as Mars and Venus, which are sometimes much nearer to us than the sun is. Their parallaxes they endeavour to find by some of the methods above explained; and if these parallaxes were known, then the parallax and distance of the sun, which cannot directly by any observations be attained, would easily be deduced from them. For from the theory of the motions of the earth and planets, we know at any time the proportion of the distances of the sun and planets from us; and the horizontal parallaxes are in a reciprocal proportion to these distances. Wherefore, knowing the parallax of a planet, we may from thence find the parallax of the sun.

Mars, when he is in an achronical position, that is, opposite to the sun, is twice as near to us as the sun is; and therefore his parallax will be twice as great. But Venus, when she is in her inferior conjunction with the sun, is four times nearer to us than he is, and her parallax is greater in the same proportion: Therefore, though the extreme smallness of the sun's parallax renders it unobservable by our senses, yet the parallaxes of Mars or Venus, which are twice or four times greater, may become sensible. The astronomers have bestowed much pains in finding out the parallax of Mars; but some time ago Mars was in his opposition to the sun, and also in his perihelion, and consequently in his nearest approach to the earth: And then he was most accurately observed by two of the most eminent astronomers of our age, who have determined his parallax to have been scarce 30 seconds; from whence it was inferred, that the parallax of the sun is scarce 11 seconds, and his distance about 19,000 semidiameters of the earth.

As the parallax of Venus is still greater than that of Mars, Dr Halley proposed a method by it of finding the distance of the sun to within a 500th part of the whole. The times of observation were at her trans-

sits over the sun in 1761 and 1769. At these times the greatest attention was given by astronomers, but it was found impossible to observe the exact times of immersion and emersion with such accuracy as had been expected; so that the matter is not yet determined so exactly as could be wished. The method of calculating the sun's distance by means of these transits, is as follows.

In fig. 6. let DBA be the earth, V Venus, and 6th Plate XLI. TSR the eastern limb of the sun. To an observer at B, the point *t* of that limb will be on the meridian, its place referred to the heaven will be at E, and Venus will appear just within it at S. But at the same instant, to an observer at A, Venus is east of the sun, in the right line AVF; the point *t* of the sun's limb appears at *e* in the heaven; and if Venus were then visible, she would appear at F. The angle CVA is the horizontal parallax of Venus, which we seek; and is equal to the opposite angle FVE, whose measure is the arc FE. ASC is the sun's horizontal parallax, equal to the opposite angle e SE, whose measure is the arc e E; and FAe (the same as VAv) is Venus's horizontal parallax from the sun, which may be found by observing how much later in absolute time her total ingress on the sun is, as seen from A than as seen from B, which is the time she takes to move from V to v in her orbit OVv.

It appears by the tables of Venus's motion and the sun's, that at the time of her transit in 1761 she moved 4' of a degree on the sun's disk in 60 minutes of time; and consequently 4" of a degree in one minute of time.

Now let us suppose, that A is 90° west of B, so that when it is noon at B it will be fix in the morning at A; that the total ingress as seen from B is at one minute past 12, but that as seen from A it is at seven minutes 30 seconds past fix; deduct fix hours for the difference of meridians of A and B, and the remainder will be fix minutes 30 seconds for the time by which the total ingress of Venus on the sun at S, is later as seen from A than as seen from B; which time being converted into parts of a degree is 26", or the arc Fe of Venus's horizontal parallax from the sun; for, as 1 minute of time is to 4 seconds of a degree, so is 6½ minutes of time to 26 seconds of a degree.

The times in which the planets perform their annual revolutions about the sun are already known by observation.—From these times, and the universal power of gravity by which the planets are retained in their orbits, it is demonstrable, that if the earth's mean distance from the sun be divided into 100,000 equal parts, Mercury's mean distance from the sun must be equal to 38,710 of these parts—Venus's mean distance from the sun, to 72,333—Mars's mean distance, 152,360—Jupiter's, 520,096—and Saturn's, 954,006. Therefore when the number of miles contained in the mean distance of any planet from the sun is known, we can by these proportions find the mean distance in miles of all the rest.

At the time of the above-mentioned transit, the earth's distance from the sun was 1015 (the mean distance being here considered as 1000), and Venus's distance from the sun 726 (the mean distance being considered as 723), which differences from the mean distances arise from the elliptical figure of the planets orbits—

6th Plate
XLI. fig. 5.

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All these
methods in-
sufficient.

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Another
method
from the pa-
rallax of
Mars.

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From that
of Venus.

bits—Subtracting 726 parts from 1015, there remain 289 parts for Venus's distance from the earth at that time.

Now, since the horizontal parallaxes of the planets are inversely as their distances from the earth's centre, it is plain, that as Venus was between the earth and the sun on the day of her transit, and consequently her parallax at that time greater than the sun's, if her horizontal parallax was then ascertained by observation, the sun's horizontal parallax might be found, and consequently his distance from the earth.—Thus, suppose Venus's horizontal parallax was found to be $36''.3480$; then, As the sun's distance 1015 is to Venus's distance 289, so is Venus's horizontal parallax $36''.3480$ to the sun's horizontal parallax $10''.3493$ on the day of her transit. And the difference of these two parallaxes, *viz.* $25''.9987$ (which may be esteemed $26''$), will be the quantity of Venus's horizontal parallax from the sun.

To find the sun's horizontal parallax at the time of his mean distance from the earth, say, As 1000 parts the sun's mean distance from the earth's centre, is to 1015, his distance therefrom on the day of the transit, so is $10''.3493$, his horizontal parallax on that day, to $10''.5045$, his horizontal parallax at the time of his mean distance from the earth's centre.

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Method of
computing
the sun's di-
stance from
his parallax.

The sun's parallax being thus (or any other way supposed to be) found, at the time of his mean distance from the earth, we may find his true distance therefrom, in semidiameters of the earth, by the following analogy. As the sine (or tangent of so small an arc as that) of the sun's parallax $10''.5045$ is to radius, so is unity or the earth's semidiameter to the number of semidiameters of the earth that the sun is distant from its centre; which number, being multiplied by 3985, the number of miles contained in the earth's semidiameter, will give the number of miles by which the sun is distant from the earth's centre.

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Distances of
the other
planets how
found.

Then, As 100,000, the earth's mean distance from the sun in parts, is to 38,710, Mercury's mean distance from the sun in parts, so is the earth's mean distance from the sun in miles to Mercury's mean distance from the sun in miles.—And,

As 100,000 is to 72,333, so is the earth's mean distance from the sun in miles to Venus's mean distance from the sun in miles.—Likewise,

As 100,000 is to 152,369, so is the earth's mean distance from the sun in miles to Mars's mean distance from the sun in miles.—Again,

As 100,000 is to 520,096, so is the earth's mean distance from the sun in miles to Jupiter's mean distance from the sun in miles.—Lastly,

As 100,000 is to 954,006, so is the earth's mean distance from the sun in miles to Saturn's mean distance from the sun in miles.

And thus, by having found the distance of any one of the planets from the sun, we have sufficient data for finding the distances of all the rest. And then from their apparent diameters at these known distances, their real diameters and bulks may be found. According to the calculations made from the transit in 1769, we have given the distance of each of the primary and secondary planets from one another, and from the sun. In Plate XLIII. their proportional bulks are shown, according to former calculations by Mr Ferguson; and in

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2^d Plate XLII. their relative magnitudes according to the latest calculations by Mr Dunn. In 3^d Plate XLII. fig. 3. 4. 5. are given three figures of Jupiter by Mr Wollaston; and in Plate XLVIII. fig. 1. the proportional distances of the satellites of Jupiter and Saturn, with the magnitudes of the sun, and orbit of our moon, by Mr Ferguson.

With regard to the fixed stars, no method of ascertaining their distance hath hitherto been found out. Those who have formed conjectures concerning them, have thought that they behaved to be at least 400,000 times farther from us than we are from the sun.

They are said to be fixed, because they have been generally observed to keep at the same distances from each other; their apparent diurnal revolutions being caused solely by the earth's turning on its axis. They appear of a sensible magnitude to the bare eye, because the retina is affected not only by the rays of light which are emitted directly from them, but by many thousands more, which falling upon our eye-lids, and upon the aerial particles about us, are reflected into our eyes so strongly as to excite vibrations not only in those points of the retina where the real images of the stars are formed, but also in other points at some distance round about. This makes us imagine the stars to be much bigger than they would appear if we saw them only by the few rays which come directly from them, so as to enter our eyes without being intermixed with others. Any one may be sensible of this, by looking at a star of the first magnitude through a long narrow tube; which, though it takes in as much of the sky as would hold 1000 such stars, yet scarce renders that one visible.

The more a telescope magnifies, the less is the aperture through which the star is seen; and consequently the fewer rays it admits into the eye. Now, since the stars appear less in a telescope which magnifies 200 times, than they do to the bare eye, inasmuch that they seem to be only indivisible points, it proves at once that the stars are at immense distances from us, and that they shine by their own proper light. If they shone by borrowed light, they would be as invisible without telescopes as the satellites of Jupiter are; for these satellites appear bigger when viewed with a good telescope than the largest fixed stars do.

The number of stars discoverable, in either hemisphere, by the naked eye, is not above a thousand. This at first may appear incredible, because they seem to be without number: but the deception arises from our looking confusedly upon them, without reducing them into order. For, look but steadily upon a pretty large portion of the sky, and count the number of stars in it, and you will be surprised to find them so few. Or, if one considers how seldom the moon meets with any stars in her way, although there are as many about her path as in other parts of the heavens, he will soon be convinced that the stars are much thinner sown than he was aware of. The British catalogue, which, besides the stars visible to the bare eye, includes a great number which cannot be seen without the assistance of a telescope, contains no more than 3000, in both hemispheres.

As we have incomparably more light from the moon than from all the stars together, it were the greatest absurdity to imagine that the stars were made for no other purpose than to cast a faint light upon the earth; especially

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Distance of
the fixed
stars im-
measurable.

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Why they
seem so big
to our naked
eye.

198
Small num-
ber visible to
the naked
eye.

especially since many more require the assistance of a good telescope to find them out than are visible without that instrument. Our sun is surrounded by a system of planets and comets; all which would be invisible from the nearest fixed star. And from what we already know of the immense distance of the stars, the nearest may be computed at 32,000,000,000,000 miles from us, which is farther than a cannon-bullet would fly in 7,000,000 years. Hence it is easy to prove, that the sun, from such a distance, would appear no bigger than a star of the first magnitude. From all this it is highly probable, that each star is a sun to a system of worlds moving round it, tho' unseen by us; especially as the doctrine of a plurality of worlds is rational, and greatly manifests the power, wisdom, and goodness, of the great Creator. See n^o 66.

The stars, on account of their apparently various magnitudes, have been distributed into several classes, or orders. Those which appear largest are called *stars of the first magnitude*; the next to them in lustre, *stars of the second magnitude*; and so on to the *sixth*, which are the smallest that are visible to the bare eye. This distribution having been made long before the invention of telescopes, the stars which cannot be seen without the assistance of these instruments are distinguished by the name of *telescopic stars*.

The ancients divided the starry sphere into particular constellations, or systems of stars, according as they lay near one another, so as to occupy those spaces which the figures of different sorts of animals or things would take up, if they were there delineated. And those stars which could not be brought into any particular constellation were called *unformed stars*.

This division of the stars into different constellations, or asterisms, serves to distinguish them from one another, so that any particular star may be readily found in the heavens by means of a celestial globe; on which the constellations are so delineated, as to put the most remarkable stars into such parts of the figures as are most easily distinguished. The number of the ancient constellations is 48, and upon our present globes about 70. On Senex's globes are inserted Bayer's letters; the first in the Greek alphabet being put to the biggest star in each constellation, the second to the next, and

so on: by which means, every star is as easily found as if a name were given to it. Thus, if the star γ in the constellation of the ram be mentioned, every astronomer knows as well what star is meant as if it were pointed out to him in the heavens.

There is also a division of the heavens into three parts. 1. The zodiac (*zōdiacus*), from *zōdion*, *zodion*, an animal, because most of the constellations in it, which are twelve in number, have the names of animals: As *Aries* the ram, *Taurus* the bull, *Gemini* the twins, *Cancer* the crab, *Libra* the balance, *Scorpio* the scorpion, *Sagittarius* the archer, *Capricornus* the goat, *Aquarius* the water-bearer, and *Pisces* the fishes. The zodiac goes quite round the heavens: it is about 16 degrees broad, so that it takes in the orbits of all the planets, and likewise the orbit of the moon. Along the middle of this zone or belt is the ecliptic, or circle which the earth describes annually as seen from the sun, and which the sun appears to describe as seen from the earth. 2. All that region of the heavens which is on the north side of the zodiac, containing 21 constellations. And, 3. That on the south side, containing 15.

The ancients divided the zodiac into the above 12 constellations or signs in the following manner. They took a vessel with a small hole in the bottom, and, having filled it with water, suffered the same to distil drop by drop into another vessel set beneath to receive it; beginning at the moment when some star rose, and continuing till it rose the next following night. The water falling down into the receiver they divided into twelve equal parts; and having two other small vessels in readiness, each of them fit to contain one part, they again poured all the water into the upper vessel; and, observing the rising of some star in the zodiac, they at the same time suffered the water to drop into one of the small vessels; and as soon as it was full, they shifted it, and set an empty one in its place. When each vessel was full, they took notice what star of the zodiac rose; and tho' this could not be done in one night, yet in many they observed the rising of 12 stars or points, by which they divided the zodiac into 12 parts.

The names of the constellations, and the number of stars observed in each of them by different astronomers, are as follow.

204 Division of the heavens. 4th and 5th Pl. XLII. fig. 1.

205 Zodiac how divided.

206 Catalogue of the constellations.

The ancient Constellations.

Ursa minor	The Little Bear
Ursa major	The Great Bear
Draco	The Dragon
Cepheus	Cepheus
Bootes, <i>Arctophilax</i>	
Corona Borealis	The Northern Crown
Hercules, <i>Engonasin</i>	Hercules kneeling
Lyra	The Harp
Cygnus, <i>Gallina</i>	The Swan
Castropea	The Lady in her Chair
Perseus	Perseus
Auriga	The Waggoner
Serpentarius, <i>Ophiuchus</i>	Serpentarius
Serpens	The Serpent
Sagitta	The Arrow
Aquila, <i>Vultur</i>	The Eagle
Antinous	Antinous
Delphinus	The Dolphin
Equulus, <i>Equi sessio</i>	The Horse's Head

Ptolemy.	Tycho.	Hevelius.	Flamsteed.
8	7	12	24
35	29	73	87
31	32	40	80
13	4	51	35
23	18	52	54
8	8	8	21
29	28	45	113
10	11	17	21
19	18	47	81
13	26	37	55
29	29	46	59
14	9	40	66
29	15	40	74
18	13	22	64
5	5	5	18
15	12	23	71
3	3	19	71
10	10	14	18
4	4	6	10

The

200 Argument for the plurality of worlds.

200 Different magnitudes of the stars.

201 Telescopic stars.

202 Unformed stars.

203 Uses of their division into constellations.

The ancient Constellations.		<i>Ptolemy.</i>	<i>Tycho.</i>	<i>Hevelius.</i>	<i>Flamsteed.</i>
Pegasus, <i>Equus</i>	The Flying Horse	20	19	38	89
Andromeda	Andromeda	23	23	47	66
Triangulum	The Triangle	4	4	12	16
Aries	The Ram	18	21	27	66
Taurus	The Bull	44	43	51	141
Gemini	The Twins	25	25	38	85
Cancer	The Crab	23	15	29	83
Leo	The Lion		30	49	95
Coma Berenices	Berenice's Hair	35	14	21	43
Virgo	The Virgin	32	33	50	110
Libra, <i>Chela</i>	The Scales	17	10	20	51
Scorpius	The Scorpion	24	10	20	44
Sagittarius	The Archer	31	14	22	69
Capricornus	The Goat	28	28	29	51
Aquarius	The Water-bearer	45	41	47	108
Pisces	The Fishes	38	36	39	113
Cetus	The Whale	22	21	45	97
Orion	Orion	38	42	62	78
Eridanus, <i>Fluvius</i>	Eridanus, the River	34	10	27	84
Lepus	The Hare	12	13	16	19
Canis major	The Great Dog	29	13	21	31
Canis minor	The Little Dog	2	2	13	14
Argo Navis	The Ship	45	3	4	64
Hydra	The Hydra	27	19	31	60
Crater	The Cup	7	3	10	31
Corvus	The Crow	7	4		9
Centaurus	The Centaur	37			35
Lupus	The Wolf	19			24
Ara	The Altar	7			9
Corona Australis	The Southern Crown	13			12
Piscis Australis	The Southern Fish	18			24

The new Southern Constellations.

Hevelius's Constellations made out of the unformed Stars.

				<i>Hevel.</i>	<i>Flamst.</i>
Columba Noachi	Noah's Dove	10			
Robur Carolinum	The Royal Oak	12	Lynx	The Lynx	19 44
Grus	The Crane	13	Leo minor	The Little Lion	53
Phoenix	The Phenix	13	Alterion & Chara	The Greyhounds	23 25
Indus	The Indian	12	Cerberus	Cerberus	4
Pavo	The Peacock	14	Vulpecula & Anser	The Fox and Goose	27 35
Apus, <i>Avi Indica</i>	The Bird of Paradise	11	Scutum Sobieski	Sobieski's Shield	7
Apis, <i>Musca</i>	The Bee or Fly	4	Lacerta	The Lizard	10 16
Chamaeleon	The Chameleon	10	Camelopardalis	The Camelopard	32 58
Triangulum Australe	The South Triangle	5	Monocerns	The Unicorn	19 31
Piscis volans, <i>Passer</i>	The Flying Fish	8	Sextans	The Sextant	11 41 (P)
Dorado, <i>Xiphias</i>	The Sword Fish	6			
Toucan	The American Goose	9			
Hydrus	The Water Snake	10			

2-7
Change of
places in the
stars.

Some of the stars, particularly Arcturus, have been observed to change their places above a minute of a degree with respect to others. But whether this be owing to any real motion in the stars themselves, must require the observations of many ages to determine. If our solar system changeth its place with regard to ab-

solute space, this must in process of time occasion an apparent change in the distances of the stars from each other: and in such a case, the places of the nearest stars to us being more affected than those which are very remote, their relative positions must seem to alter, tho' the stars themselves were really immoveable. On the

5 K 2 other

(P) To the conjectures mentioned n^o 61.—70. concerning the disappearance of some stars, we may add that of Mr Maupertuis, who, in his Dissertation on the figures of the celestial bodies (p. 61.—63.), is of opinion, that some stars, by their prodigious quick rotations on their axes, may not only assume the figures of oblate spheroids, but that, by the great centrifugal force arising from such rotations, they may become of the figures of mill-flores; or be reduced to flat circular planes, so thin as to be quite invisible when their edges are turned towards us; as Saturn's ring is in such positions. But when very excentric planets or comets go round any flat star, in orbits much inclined to its equator, the attraction of the planets or comets in their perihelions must alter the inclination of the axis of that star; on which account it will appear more or less large and luminous, as its broad side is more or less turned towards us. And thus he imagines we may account for the apparent changes of magnitude and lustre in those stars, and likewise for their appearing and disappearing.

other hand, if our own system be at rest, and any of the stars in real motion, this must vary their positions; and the more so, the nearer they are to us, or swifter their motions are, or the more proper the direction of their motions is for our perception. See note on n° 89.

208
Change in the obliquity of the ecliptic.

The obliquity of the ecliptic to the equinoctial is found at present to be above the third part of a degree less than Ptolemy found it. And most of the observers after him found it to decrease gradually down to Tycho's time. If it be objected, that we cannot depend on the observations of the ancients, because of the incorrectness of their instruments; we have to answer, that both Tycho and Flamsteed are allowed to have been very good observers; and yet we find that Flamsteed makes this obliquity $2\frac{1}{2}$ minutes of a degree less than Tycho did about 100 years before him: and as Ptolemy was 1324 years before Tycho, so the gradual decrease answers nearly to the difference of time between these three astronomers. If we consider, that the earth is not a perfect sphere, but an oblate spheroid, having its axis shorter than its equatorial diameter; and that the sun and moon are constantly acting obliquely upon the greater quantity of matter about the equator, pulling it, as it were, towards a nearer and nearer coincidence with the ecliptic; it will not appear improbable that these actions should gradually diminish the angle between those planes. Nor is it less probable that the mutual attractions of all the planets should have a tendency to bring their orbits to a coincidence: but this change is too small to become sensible in many ages.

Sect. IX. *Of calculating the periodical Times, Places, &c. of the Sun, Moon, and Planets; Delination of the Phases of the Moon for any particular time; and the Construction of Astronomical Tables.*

This title includes almost all of what may be called the *Practical part of Astronomy*; and as it is by far the most difficult and abstruse, so the thorough investigation of it would necessarily lead us into very deep geometrical demonstrations. The great labours of former astronomers have left little for succeeding ones to do in this respect: tables of the motions of all the celestial bodies have been made long ago, the periodical times, excentricities, &c. of the planets determined; and as we suppose few will desire to repeat these laborious operations, we shall here content ourselves with giving some general hints of the methods by which these things have been originally accomplished, that so the operations of the young astronomer who makes use of tables already formed to his hand may not be merely mechanical.

n° 174.

209
Latitude of any place how found.

It hath been already observed*, that the foundation of all astronomical operations was the drawing a meridian line. This being done, the next thing is to find out the latitude of the place where the observations are to be made, and for which the meridian line is drawn. From what hath been said n° 3. it will easily be understood that the latitude of a place must always be equal to the elevation either of the north or south pole above the horizon; because when we are exactly on the equator, both poles appear in the horizon. There is, however, no star exactly in either of the celestial poles; therefore, to find the altitude of that invisible point called the *Pole of the Heavens*, we must choose some star

near it which does not set; and having by several observations, according to the directions given n° 177, found its greatest and least altitudes, divide their difference by 2; and half that difference added to the least, or subtracted from the greatest, altitude of the star, gives the exact altitude of the pole or latitude of the place. Thus, suppose the greatest altitude of the star observed is 60° , and its least 50° , we then know that the latitude of the place where the observation was made is exactly 55° .

210
Obliquity of the ecliptic found.

The latitude being once found, the obliquity of the ecliptic, or the angle made by the sun's annual path with the earth's equator, is easily obtained by the following method. Observe, about the summer solstice, the sun's meridian distance from the zenith, which is easily done by a quadrant with a moveable index furnished with sights; if this distance is subtracted from the latitude of the place, provided the sun is nearer the equator than the place of observation, the remainder will be the obliquity of the ecliptic. But if the place of observation is nearer the equator than the sun at that time, the zenith distance must be added. By this method, the obliquity of the ecliptic hath been determined to be $23^\circ 29'$.

211
Sun's declination.

By the same method the declination of the sun from the equator for any day may be found; and thus a table of his declination for every day in the year might be constructed: thus also the declination of the stars might be found.

212
His place in the ecliptic how found. Pl. XLIII. fig. 6.

Having the declination of the sun, his right ascension and place in the ecliptic may be geometrically found by the solution of a case in spherical trigonometry. For let EQ represent the celestial equator, y the sun, and yX the ecliptic; then, in the right-angled spherical triangle ECy, we have the side EY, equal to the sun's declination: the angle ECy is always $23^\circ 29'$, being the angle of the ecliptic with the equator; and the angle yEC is 90° , or a right angle. From these data we can find the side EC the right ascension; and Cy the sun's place in the ecliptic, or his distance from the equinoctial point; and thus a table of the sun's place for every day in the year, answerable to his declination, may be formed.

213
To find the right ascension of the stars.

Having the sun's place in the ecliptic, the right ascension of the stars may be found by the help of it and a good pendulum clock: For which purpose the motion of the clock must be so adjusted, that the hand may run thro' the 24 hours in the same time that a star leaving the meridian will arrive at it again; which time is somewhat shorter than the natural day, because of the space the sun moves through in the mean time eastward. The clock being thus adjusted, when the sun is in the meridian, fix the hand to the point from whence we are to begin to reckon our time; and then observe when the star comes to the meridian, and mark the hour and minute that the hand then shews: The hours and minutes described by the index, turned into degrees and minutes of the equator, will give the difference between the right ascension of the sun and stars; which difference, being added to the right ascension of the sun, will give the right ascension of the star. Now, if we know the right ascension of any one star, we may from it find the right ascensions of all the others which we see, by marking the time upon the clock between the arrival of the star, whose right ascension we know, to the meridian, and another star, whose ascension is

to be found. This time converted into hours and minutes of the equator, will give the difference of right ascensions; from whence, by addition, we collect the right ascension of the star which was to be found out.

214
Their longitudes and latitudes found.

The right ascension and declination of a star being known, its longitude, and latitude, or distance from the first star of Aries, and north or south from the ecliptic, may thence be easily found, from the solution of a case in spherical trigonometry, similar to that already mentioned concerning the sun's place; and the places of the fixed stars being all marked in a catalogue according to their longitudes and latitudes, it may thence be conceived how the longitude and latitude of a planet or comet may be found for any particular time by comparing its distance from them, and its apparent path may thus be traced; and thus the paths of Mercury and Venus were traced by M. Cassini, though Mr Ferguson made use of an orrery for that purpose.

215
To find the periodical times of the planets.

With regard to the planets, the first thing to be done is to find out their periodical times, which is done by observing when they have no latitude. At that time the planet is in the ecliptic, and consequently in one of its nodes; so that, by waiting till it returns to the same node again, and keeping an exact account of the time, the periodical time of its revolution round the sun may be known pretty exactly. By the same observations, from the theory of the earth's motion we can find the position of the line of the nodes, and when once the position of this line is found, the angle of inclination of that planet's orbit to the earth may also be known.

216
Excentricity of the earth's orbit how determined.

The excentricity of the earth's orbit may be determined by observing the apparent diameters of the sun at different times: when the sun's diameter is least, the earth is at the greatest distance; and when this diameter is greatest, the earth is at its least distance from him. But as this method must necessarily be precarious, another is recommended by Dr Keil, by observing the velocity of the earth in its orbit, or the apparent velocity of the sun, which is demonstrated to be always reciprocally as the square of the distance.

217
Of the other planets.

The excentricities of the orbits of the other planets may be likewise found by observing their velocities at different times; for all of them observe the same proportions with regard to the increase or decrease of their velocity that the earth does; only, in this case, care must be taken to observe the real, not the apparent, velocities of the planets, the last depending on the motion of the earth at the same time. Their aphelia, or points of their orbits where they are farthest from the sun, may be known by making several observations of their distances from him, and thus perceiving when these distances cease to increase.

218
To find their places in their orbits.

The position of the aphelion being determined, the planet's distance from it at any time may also be found by observation, which is called its *true* or *coequated* anomaly; but by supposing the motion of the planet to be regular and uniform, tables of that motion may easily be constructed. From thence the planet's mean place in its orbit may be found for any moment of time; and one of these moments being fixed upon as an epocha or beginning of the table, it is easy to understand, that from thence tables of the planet's place in its orbit for any number of years either preceding or consequent to that period may be constructed. These tables are to be constructed according to the meridian

of equal time, and not true or apparent time, because of the inequalities of the earth's motion as well as of that of the planet, and equations must be made to be added to or subtracted from the mean motion of the planet, as occasion requires; which will be readily understood from what we have already mentioned concerning the unequal motion of the earth in its orbit. When all the necessary tables are constructed by this or similar methods, the calculating of the planetary places becomes a mere matter of mechanism, and consists only in the proper additions and subtractions according to the directions always given along with such tables.

219
Inaccuracies from the mutual attraction of the planets.

It must be observed, however, that the accidental interference of the planets with one another by their mutual attractions render it impossible to construct any tables that shall remain equally perfect; and therefore frequent actual observations and corrections of the tables will be necessary. This disturbance, however, is inconsiderable, except in the planets Jupiter and Saturn, and they are in conjunction only once in 800 years.

220
Difficulties with regard to the moon.

What hath been already mentioned with regard to the planets, is also applicable to the moon; but with more difficulty, on account of the greater inequalities of her motions. She indeed moves in an ellipse as the rest do, and its excentricity may be better computed from observing her diameter at different times than that of the earth's orbit; but that excentricity is not always the same. The reason of this, and indeed of all the other lunar inequalities, is, that the sun has a sensible effect upon her by his attraction, as well as the earth. Consequently, when the earth is at its least distance from the sun, her orbit is dilated, and she moves more slowly; and, on the contrary, when the earth is in its aphelion, her orbit contracts, and she moves more swiftly. The excentricity is always greatest when the line of the apides coincides with that of the syzygies, and the earth at its least distance from the sun. When the moon is in her syzygies, *i. e.* in the line that joins the centres of the earth and sun, which is either in her conjunction or opposition, she moves swifter, *ceteris paribus*, than in the quadratures. According to the different distances of the moon from the syzygies, she changes her motion: from the conjunction to her first quadrature, she moves somewhat slower; but recovers her velocity in the second quarter. In the third quarter she again loses, and in the last again recovers it. The apogee of the moon is also irregular; being found to move forward when it coincides with the line of the syzygies, and backwards when it cuts that line at right angles. Nor is this motion in any degree equal: in the conjunction or opposition, it goes briskly forwards; and, in the quadratures, moves either slowly forwards, stands still, or goes backward. The motion of the nodes has been already taken notice of*: but this motion is not uniform more than the rest; for when the line of the nodes coincides with that of the syzygies, they stand still; when their line cuts that at right angles, they go backwards, with the velocity, as Sir Isaac Newton hath shewn, of 16", 19", 24" an hour. The only equable motion the moon has, is her revolution on her axis, which she always performs exactly in the space of time in which she moves round the earth. From hence arises what is called the *Moon's libration*; for as the motion round her axis is equable, and that in her orbit unequal, it follows, that when the moon

221
Moves equably on her axis.

is in her perigee, where she moves swiftest, that part of her surface, which on account of the motion in her orbit would be turned from the earth, is not so, by reason of the motion on her axis. Thus some parts in the limb or margin of the moon sometimes recede from, and sometimes approach towards, the centre of the disk. Yet this equable rotation produces an apparent irregularity; for the axis of the moon, not being perpendicular, but a little inclined to its orbit, and this axis maintaining its parallelism round the earth, it must necessarily change its situation with respect to an observer on the earth, to whom sometimes the one and sometimes the other pole of the moon becomes visible; whence it appears to have a kind of wavering or vacillatory motion.

212
Lunar irregularities accounted for by Sir Isaac Newton.

From all these irregularities it may well be concluded, that the calculation of the moon's place in her orbit is a very difficult matter; and indeed, before Sir Isaac Newton, astronomers in vain laboured to subject the lunar irregularities to any rule. By his labours, however, and those of other astronomers, these difficulties are in a great measure overcome; and calculations with regard to this luminary may be made with as great certainty as concerning any other. Her periodical time may be determined from the observation of two lunar eclipses, at as great a distance from one another as possible; for in the middle of every lunar eclipse, the moon is exactly in opposition to the sun. Compute the time between these two eclipses or oppositions, and divide this by the number of lunations that have intervened, and the quotient will be the synodical month, or time the moon takes to pass from one conjunction to another, or from one opposition to another. Compute the sun's mean motion in the time of the synodical month, and add this to the entire circle described by the moon. Then, As that sum is to 360°, so is the quantity of the synodical month to the periodical, or time that the moon takes to move from one point of her orbit to the same point again. Thus, Copernicus in the year 1500, November 6th, at 2 hours 20 minutes, observed an eclipse of the moon at Rome; and August 1st 1523, at 4 hours 25 minutes, another at Cracow: hence the quantity of the synodical month is thus determined

	Y.	D.	H.	M.
Observ. 2 ^d 1523	237	4	25	
Observ. 1 st 1500	210	2	20	
	—	—	—	—
Interval of time	22	292	2	5
Add the intercalary days for leap years.	5			
Exact interval	22	297	2	5, or 11991005 ¹

This interval divided by 282, the number of months elapsed in that time, gives 29 days 12 hours 41 minutes for the length of the synodical month. But from the observations of two other eclipses, the same author more accurately determined the quantity of the synodical month to be 29 degrees 11 hours 45 minutes 3 seconds; from whence the mean periodical time of the moon comes to be 27 degrees 7 hours 43 minutes 5 seconds, which exactly agrees with the observations of later astronomers.

214
Her diurnal and horary motion.

The quantity of the periodical month being given, by the Rule of Three we may find the moon's diurnal and horary motion; and thus may tables of the moon's

mean motion be constructed; and if from the moon's mean diurnal motion that of the sun be subtracted, the remainder will be the moon's mean diurnal motion from the sun.

Having the moon's distance from the sun, her phases for that time may be easily delineated by the following method laid down by Dr Keil. "Let the circle COBP represent the disk of the moon, which is turned towards the earth; and let OP be the line in which the semicircle OMP is projected, which suppose to be cut by the diameter BC, at right angles; and, making LP the radius, take LF equal to the cosine of the elongation of the moon from the sun: And then upon BC, as the great axis, and LF the lesser axis, describe the semi-ellipse BFC. This ellipse will cut off from the disk of the moon the portion BFOP of the illuminated face, which is visible to us from the earth."

5th Plate
X.LII. fig.
1. 3.
2. 5.
Her phases delineated.

Since in the middle of a total eclipse the moon is exactly in the node, if the sun's place be found for that time, and six signs added to it, if the eclipse is a lunar one the sun will give the place of the node, or if the eclipse observed is a solar one, the place of the node and of the sun are the same. From comparing two eclipses together, the mean motion of the nodes will thus be found out. The apogee of the moon may be known from her apparent diameter, as already observed; and by comparing her place when in the apogee at different times, the motion of the apogee itself may also be determined.

216
Place of the nodes how found.

These short hints will be sufficient to give a general knowledge of the methods used for the solution of some of the most difficult problems in astronomy. As for the proper equations to be added or subtracted, in order to find out the true motion and place of the moon, together with the particular methods of constructing tables for calculating eclipses, they are given from Mr Ferguson, in the following section.

Sec. X. Of Eclipses: With Tables for their Calculation; the method of constructing them; rules for calculation, and directions for the delineation, of Solar and Lunar Eclipses.

EVERY planet and satellite is illuminated by the sun; and casts a shadow towards that point of the heavens which is opposite to the sun. This shadow is nothing but a privation of light in the space hid from the sun by the opaque body that intercepts his rays.

When the sun's light is so intercepted by the moon, that to any place of the earth the sun appears partly or wholly covered, he is said to *undergo an eclipse*; though, properly speaking, it is only an eclipse of that part of the earth where the moon's shadow or penumbra falls. When the earth comes between the sun and moon, the moon falls into the earth's shadow; and, having no light of her own, she suffers a real eclipse from the interception of the sun's rays. When the sun is eclipsed to us, the moon's inhabitants, on the side next the earth, see her shadow like a dark spot travelling over the earth, about twice as fast as its equatorial parts move, and the same way as they move. When the moon is in an eclipse, the sun appears eclipsed to her, total to all those parts on which the earth's shadow falls, and of as long continuance as they are in the shadow.

227
Eclipse defined.

218
Figure of
the earth
spherical.

That the earth is spherical (for the hills take off no more from the roundness of the earth, than grains of dust do from the roundness of a common globe) is evident from the figure of its shadow on the moon; which is always bounded by a circular line, although the earth is incessantly turning its different sides to the moon, and very seldom shews the same side to her in different eclipses, because they seldom happen at the same hours. Were the earth shaped like a round flat plate, its shadow would only be circular when either of its sides directly faced the moon, and more or less elliptical as the earth happened to be turned more or less obliquely towards the moon when she is eclipsed. The moon's different phases prove her to be round; for, as she keeps still the same side towards the earth, if that side were flat, as it appears to be, she would never be visible from the third quarter to the first; and from the first quarter to the third, she would appear as round as when we say *she is full*; because, at the end of her first quarter, the sun's light would come as suddenly on all her side next the earth, as it does on a flat wall, and go off as abruptly at the end of her third quarter.

219
Moon's figure
the same.

220
Shadows of
the earth
and moon
conical.

If the earth and sun were equally large, the earth's shadow would be infinitely extended, and all of the same bulk; and the planet Mars, in either of its nodes and opposite to the sun, would be eclipsed in the earth's shadow. Were the earth larger than the sun, its shadow would increase in bulk the farther it extended, and would eclipse the great planets Jupiter and Saturn, with all their moons, when they were opposite to the sun. But as Mars, in opposition, never falls into the earth's shadow, altho' he is not then above 42,000,000 miles from the earth, it is plain that the earth is much less than the sun; for otherwise its shadow could not end in a point at so small a distance. If the sun and moon were equally large, the moon's shadow would go on to the earth with an equal breadth, and cover a portion of the earth's surface more than 2000 miles broad, even if it fell directly against the earth's centre, as seen from the moon; and much more if it fell obliquely on the earth. But the moon's shadow is seldom 150 miles broad at the earth, unless when it falls very obliquely on the earth, in total eclipses of the sun. In annular eclipses, the moon's real shadow ends in a point at some distance from the earth. The moon's small distance from the earth, and the shortness of her shadow, prove her to be less than the sun. And, as the earth's shadow is large enough to cover the moon, if her diameter were three times as large as it is (which is evident from her long continuance in the shadow when she goes through its centre), it is plain, that the earth is much bigger than the moon.

221
Why there
are so few
eclipses.

Though all opaque bodies, on which the sun shines, have their shadows, yet such is the bulk of the sun, and the distances of the planets, that the primary planets can never eclipse one another. A primary can eclipse only its secondary, or be eclipsed by it; and never but when in opposition or conjunction with the sun. The primary planets are very seldom in these positions, but the sun and moon are so every month: Whence one may imagine, that these two luminaries should be eclipsed every month. But there are few eclipses in respect of the number of new and full moons; the reason of which we shall now explain.

If the moon's orbit were coincident with the plane

of the ecliptic, in which the earth always moves and the sun appears to move, the moon's shadow would fall upon the earth at every change, and eclipse the sun to some parts of the earth. In like manner, the moon would go through the middle of the earth's shadow, and be eclipsed at every full; but with this difference, that she would be totally darkened for above an hour and an half; whereas the sun never was above four minutes totally eclipsed by the interposition of the moon. But one half of the moon's orbit is elevated 5½ degrees above the ecliptic, and the other half as much depressed below it; consequently, the moon's orbit intersects the ecliptic in two opposite points called the *moon's nodes*, as has been already taken notice of. When these points are in a right line with the centre of the sun at new or full moon, the sun, moon, and earth, are all in a right line; and if the moon be then new, her shadow falls upon the earth; if full, the earth's shadow falls upon her. When the sun and moon are more than 17 degrees from either of the nodes at the time of conjunction, the moon is then generally too high or too low in her orbit to cast any part of her shadow upon the earth; when the sun is more than 12 degrees from either of the nodes at the time of full moon, the moon is generally too high or too low in her orbit to go through any part of the earth's shadow: and in both these cases there will be no eclipse. But when the moon is less than 17 degrees from either node at the time of conjunction, her shadow or penumbra falls more or less upon the earth, as she is more or less within this limit. And when she is less than 12 degrees from either node at the time of opposition, she goes through a greater or less portion of the earth's shadow, as she is more or less within this limit. Her orbit contains 360 degrees; of which 17, the limit of solar eclipses on either side of the nodes, and 12, the limit of lunar eclipses, are but small portions: And as the sun commonly passes by the nodes but twice in a year, it is no wonder that we have so many new and full moons without eclipses.

To illustrate this, (Plate L. fig. 1.) let ABCD be the ecliptic, RSTU a circle lying in the same plane with the ecliptic, and VXYZ the moon's orbit, all thrown into an oblique view, which gives them an elliptical shape to the eye. One half of the moon's orbit, as VWX, is always below the ecliptic, and the other half XYV above it. The points V and X, where the moon's orbit intersects the circle RSTU, which lies even with the ecliptic, are the moon's nodes; and a right line, as XEV, drawn from one to the other, through the earth's centre, is the line of the nodes, which is carried almost parallel to itself round the sun in a year.

If the moon moved round the earth in the orbit RSTU, which is coincident with the plane of the ecliptic, her shadow would fall upon the earth every time she is in conjunction with the sun, and at every opposition she would go through the earth's shadow. Were this the case, the sun would be eclipsed at every change, and the moon at every full, as already mentioned.

But although the moon's shadow N must fall upon the earth at *a*, when the earth is at E, and the moon in conjunction with the sun at *i*, because she is then very near one of her nodes; and at her opposition *n* she must go through the earth's shadow I, because she is then near the other node; yet, in the time that she goes round:

round the earth to her next change, according to the order of the letters XYVV, the earth advances from E to e , according to the order of the letters EFGH; and the line of the nodes VEX, being carried nearly parallel to itself, brings the point f of the moon's orbit in conjunction with the sun at that next change; and then the moon being at f , is too high above the ecliptic to cast her shadow on the earth: and as the earth is still moving forward, the moon at her next opposition will be at g , too far below the ecliptic to go through any part of the earth's shadow; for by that time the point g will be at a considerable distance from the earth as seen from the sun.

When the earth comes to F, the moon in conjunction with the sun Z is not at k in a plane coincident with the ecliptic, but above it at Y in the highest part of her orbit; and then the point b of her shadow O goes far above the earth (as in fig. 2. which is an edge view of fig. 1). The moon at her next opposition, is not at o (fig. 1.), but at W, where the earth's shadow goes far above her (as in fig. 2). In both these cases the line of the nodes VEX (fig. 1) is about ninety degrees from the sun, and both luminaries are as far as possible from the limits of the eclipses.

When the earth has gone half round the ecliptic from E to G, the line of the nodes VEX is nearly, if not exactly, directed towards the sun at Z; and then the new-moon l casts her shadow P on the earth G; and the full moon p goes through the earth's shadow L; which brings on eclipses again, as when the earth was at E.

When the earth comes to H, the new moon falls not at m in a plane coincident with the ecliptic CD, but at W in her orbit below it; and then her shadow Q (see fig. 2.) goes far below the earth. At the next full she is not at q (fig. 1.) but at Y in her orbit 5½ degrees above q , and at her greatest height above the ecliptic CD; being then as far as possible, at any opposition, from the earth's shadow M, as in fig. 2.

So, when the earth is at E and G, the moon is about her nodes at new and full, and in her greatest north and south declination (or latitude as it is generally called) from the ecliptic at her quarters; but when the earth is at F or H, the moon is in her greatest north and south declination from the ecliptic at new and full, and in the nodes about her quarters.

The point X, where the moon's orbit crosses the ecliptic, is called the *ascending node*, because the moon ascends from it above the ecliptic; and the opposite point of intersection V is called the *descending node*, because the moon descends from it below the ecliptic. When the moon is at Y in the highest point of her orbit, she is in her greatest north latitude; and when she is at W in the lowest point of her orbit, she is in her greatest south latitude.

If the line of the nodes, like the earth's axis, was carried parallel to itself round the sun, there would be just half a year between the conjunctions of the sun and nodes. But the nodes shift backwards, or contrary to the earth's annual motion, 19½ deg. every year; and therefore the same node comes round the sun 19 days sooner every year than on the year before. Consequently, from the time that the ascending node X (when the earth is at E) passes by the sun as seen from the earth, it is only 17½ days (not half a year) till the

descending node V passes by him. Therefore in whatever time of the year we have eclipses of the luminaries about either node, we may be sure that in 17½ days afterward we shall have eclipses about the other node. And when at any time of the year the line of the nodes is in the situation VGX, at the same time next year it will be in the situation VGX; the ascending node having gone backward, that is, contrary to the order of signs, from X to x , and the descending node from V to v ; each 19½ deg. At this rate, the nodes shift through all the signs and degrees of the ecliptic in 18 years and 225 days; in which time there would always be a regular period of eclipses, if any complete number of lunations were finished without a fraction. But this never happens: for if both the sun and moon should start from a line of conjunction with either of the nodes in any point of the ecliptic, the sun would perform 18 annual revolutions and 222 degrees over and above, and the moon 230 lunations and 85 degrees of the 231st, by the time the node came round to the same point of the ecliptic again; so that the sun would then be 138 degrees from the node, and the moon 85 degrees from the sun.

But, in 223 mean lunations, after the sun, moon, and nodes, have been once in a line of conjunction, they return so nearly to the same state again, as that the same node, which was in conjunction with the sun and moon at the beginning of the first of these lunations, will be within 28' 12" of a degree of a line of conjunction with the sun and moon again, when the last of these lunations is completed. And therefore in that time there will be a regular period of eclipses, or return of the same eclipse, for many ages.—In this period (which was first discovered by the Chaldeans) there are 18 Julian years 11 days 7 hours 43 minutes 20 seconds, when the last day of February in leap-years is four times included; but when it is five times included, the period consists of only 18 years 10 days 7 hours 43 minutes 20 seconds. Consequently, if to the mean time of any eclipse, either of the sun or moon, you add 18 Julian years 11 days 7 hours 43 minutes 20 seconds, when the last day of February in leap-years comes in four times, or a day less when it comes in five times, you will have the mean time of the return of the same eclipse.

But the falling back of the line of conjunctions or oppositions of the sun and moon 28' 12" with respect to the line of the nodes in every period, will wear it out in process of time; and after that, it will not return again in less than 12,492 years.—These eclipses of the sun, which happen about the ascending node, and begin to come in at the north pole of the earth, will go a little southerly at each return, till they go quite off the earth at the south pole; and those which happen about the descending node, and begin to come in at the south pole of the earth, will go a little northerly at each return, till at last they quite leave the earth at the north pole.

To exemplify this matter, we shall first consider the sun's eclipse, (March 21st old style, April 1st new style), A. D. 1764, according to its true revolutions, without equating the times, or the sun's distance from the node; and then according to its true equated times.

This eclipse fell in open space at each return, quite clear of the earth, ever since the creation, till A. D.

332
Appearance of eclipses determined from the motion of the nodes.

333
When the same eclipse returns again.

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History of the solar eclipse in 1764.

TABLE I. The mean Time of New Moon in March, Old Style; with the mean Anomalies of the Sun and Moon, and the Sun's mean Distance from the Moon's ascending Node, from A. D. 1700 to A. D. 1800 inclusive.

A. D.	Mean New Moon in March.				Sun's mean Anomaly.				Moon's mean Anomaly.				Sun's mean Dist. from the Node.			
	D.	H.	M.	S.	°	'	"	°	'	"	°	'	"	°	'	"
1700	8	16	11	25	8	19	58	48	1	22	30	37	6	14	31	7
1701	27	13	44	59	9	8	20	59	0	28	7	42	7	23	14	8
1702	16	22	32	41	8	27	36	51	11	7	55	47	8	1	16	55
1703	6	7	21	18	18	16	52	43	9	17	43	52	8	9	19	42
1704	24	4	53	57	9	5	14	54	8	23	20	57	9	18	2	43
1705	13	13	42	34	8	24	30	47	7	3	9	2	9	26	5	30
1706	2	22	31	11	18	13	46	39	5	12	57	7	10	4	8	17
1707	21	20	3	50	9	2	8	50	4	18	34	13	11	12	51	18
1708	10	4	52	27	8	21	24	43	2	28	22	18	11	20	54	5
1709	29	2	25	79	9	9	46	54	2	3	59	24	0	29	37	6
1710	18	11	13	43	8	29	2	47	0	13	47	30	1	7	39	54
1711	7	20	2	20	18	18	39		10	23	35	36	1	15	42	41
1712	25	17	34	59	9	6	40	51	9	29	12	42	2	14	25	43
1713	15	2	23	36	8	25	56	43	8	9	0	47	3	2	28	30
1714	4	11	12	13	8	15	12	35	6	18	48	52	3	10	31	17
1715	23	8	44	52	9	3	34	47	5	24	25	57	4	19	14	18
1716	11	17	33	29	8	22	50	39	4	4	14	2	4	27	17	5
1717	1	2	22	5	8	12	6	32	2	14	2	8	5	5	19	52
1718	19	23	54	45	0	28	44		1	19	39	13	6	12	2	54
1719	9	8	43	22	18	19	44	37	11	29	27	18	6	22	5	41
1720	27	6	16	19	19	8	6	49	11	5	4	24	8	0	48	43
1721	16	15	4	38	8	27	22	41	9	14	52	29	8	8	51	29
1722	5	23	53	14	8	16	38	33	7	24	40	34	8	16	54	16
1723	24	21	25	54	9	5	0	45	7	0	17	40	9	25	37	18
1724	13	6	14	31	8	24	16	37	5	10	5	45	10	3	40	5
1725	2	15	3	7	18	13	32	29	3	19	53	50	10	11	42	52
1726	21	12	35	47	9	1	54	41	2	25	30	56	10	10	25	54
1727	10	21	24	23	8	21	10	34	1	5	19	1	11	28	28	41
1728	28	18	57	39	9	0	52	46	0	10	56	7	1	7	11	42
1729	18	3	45	40	8	28	48	39	10	20	44	12	1	15	14	29
1730	7	12	34	16	18	4	31		9	0	32	17	1	23	17	16
1731	26	10	6	50	6	26	42		8	6	9	23	3	2	0	17
1732	14	18	55	33	8	25	42	34	6	15	57	28	3	10	3	4
1733	4	3	44	9	8	14	58	26	4	25	45	33	3	18	5	51
1734	23	1	16	49	9	3	20	38	4	1	22	39	4	26	48	53
1735	12	10	5	25	8	22	36	30	2	11	10	44	5	4	51	40
1736	0	18	54	28	11	52	22		20	20	58	49	5	12	54	27
1737	19	16	26	42	9	0	14	34	11	26	35	55	6	21	37	29
1738	9	1	15	18	19	30	26		10	6	24	0	6	29	40	16
1739	27	22	47	58	9	7	52	38	9	12	1	6	8	8	23	18
1740	16	7	36	34	8	27	8	30	7	21	49	11	8	16	26	5
1741	5	16	25	11	18	16	24	22	6	1	37	16	8	24	28	52
1742	24	13	57	52	9	4	46	34	5	7	14	22	10	3	11	54
1743	13	22	46	27	8	24	2	27	3	17	2	27	10	1	14	41
1744	2	7	35	4	8	13	18	20	1	26	50	32	10	19	17	28
1745	21	5	7	44	9	1	40	32	1	12	27	38	11	28	0	30
1746	10	13	56	28	20	56	24		11	12	15	43	0	6	3	11
1747	29	11	29	0	9	9	18	36	10	17	52	49	1	14	46	19
1748	17	20	17	36	8	28	34	28	8	27	40	54	1	22	49	5
1749	7	5	6	13	8	17	50	20	7	7	28	59	2	0	51	52
1750	26	2	38	53	6	12	32		6	13	6	5	3	9	34	53
1751	15	11	27	29	8	25	28	24	4	22	54	10	3	17	37	40
1752	3	20	16	6	18	14	44	16	3	2	42	15	3	25	40	27
1753	22	17	48	45	9	3	6	26	2	8	19	21	5	4	23	28
1754	12	2	37	22	8	22	22	20	0	18	7	26	5	12	26	15
1755	1	11	25	59	8	11	38	12	10	27	55	31	5	20	29	2
1756	19	8	58	38	9	0	24		10	3	32	37	6	29	12	3
1757	8	17	47	15	8	19	16	16	8	13	20	42	7	7	14	50
1758	27	15	19	54	9	7	38	28	7	18	57	48	8	15	57	52
1759	17	0	8	31	8	26	54	20	5	28	45	54	8	24	0	39
1760	5	8	57	8	8	16	10	12	4	8	34	0	9	2	3	26
1761	24	6	29	47	9	4	32	24	3	14	11	6	10	10	46	27
1762	13	15	18	24	8	23	48	16	1	23	59	11	10	18	49	14
1763	3	0	7	1	18	13	4	8	0	3	47	16	10	26	52	1
1764	20	21	39	40	9	1	26	20	1	9	24	21	0	5	35	2
1765	10	6	28	17	8	20	42	13	9	19	12	26	0	13	37	49
1766	29	4	0	56	9	9	4	20	8	24	49	32	1	22	20	51
1767	18	12	49	33	8	28	20	10	7	4	37	37	2	2	23	38
1768	6	21	38	10	8	17	36	9	5	14	25	42	2	8	26	25
1769	25	19	10	40	9	5	58	21	4	20	2	48	3	17	9	27
1770	15	3	59	26	8	25	14	13	2	29	50	53	3	25	12	14
1771	4	12	48	2	8	14	30	5	1	9	38	58	4	3	15	1
1772	22	10	20	43	9	2	52	17	0	15	16	4	5	11	58	3
1773	11	19	9	19	8	22	8	9	10	25	4	9	5	20	0	50
1774	1	3	57	55	8	11	24	1	9	4	52	14	5	28	3	37
1775	20	1	30	35	8	29	46	13	8	10	29	20	7	6	46	38
1776	8	10	19	12	8	19	2	5	6	20	17	25	7	14	49	25
1777	27	7	51	51	7	7	24	17	5	25	54	3	8	23	32	26
1778	16	16	40	28	3	26	40	9	4	5	42	36	9	1	35	13
1779	6	1	29	4	8	15	56	1	1	25	30	41	9	9	38	0
1780	23	23	1	44	8	4	18	13	1	21	7	47	10	18	21	1
1781	13	7	50	21	8	23	34	5	0	0	55	52	10	26	23	48
1782	2	16	38	57	8	12	49	58	10	10	43	57	11	4	26	35
1783	21	14	11	37	9	1	12	10	9	16	21	3	0	13	9	36
1784	9	23	0	13	8	20	28	3	7	26	9	8	0	21	12	23
1785	28	20	32	53	9	8	50	15	7	1	46	14	1	29	55	25
1786	18	5	21	30	8	28	6	7	5	11	34	19	2	7	58	12
1787	7	14	10	6	8	17	21	59	3	21	22	24	2	16	0	59
1788	25	11	42	46	9	5	44	11	2	26	59	30	3	24	44	1
1789	14	20	31	23	8	25	0	3	1	6	47	35	4	2	46	48
1790	4	5	19	59	8	14	15	55	11	16	35	40	4	10	49	35
1791	23	2	52	39	9	2	38	7	10	22	12	46	5	19	32	37
1792	11	11	41	15	8	21	53	59	9	2	0					

TABLE II. Mean New Moon, &c. in March, New Style, from A. D. 1752 to A. D. 1800.

Year of Civil	Mean New Moon in March.				Sun's Mean Anomaly.				Moon's mean Anomaly.				Sun's Mean Dist. from the Node.			
	D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"
1752	14	20	16	6	8	14	44	16	3	2	42	15	3	25	40	27
1753	4	5	4	42	8	4	0	8	1	12	30	20	4	3	43	14
1754	23	2	37	22	8	22	22	0	0	18	7	26	5	12	26	15
1755	12	11	25	59	8	11	38	12	10	27	55	31	5	20	29	2
1756	30	8	58	38	9	0	0	24	10	3	32	37	6	29	12	3
1757	19	17	47	15	8	19	16	16	8	13	20	42	7	7	14	50
1758	9	2	35	51	8	8	32	8	6	23	8	47	7	15	17	38
1759	28	0	8	31	8	26	54	20	5	28	45	54	8	24	0	39
1760	16	8	57	8	8	16	10	12	4	8	34	0	9	2	3	26
1761	5	17	45	44	8	5	26	4	2	18	22	5	9	10	6	13
1762	24	15	18	24	8	23	48	16	1	23	59	11	10	18	49	14
1763	14	0	7	1	8	13	4	8	0	3	47	16	10	26	52	1
1764	2	8	55	36	8	2	20	0	10	13	35	21	11	4	54	48
1765	21	6	28	17	8	20	42	13	9	19	12	26	0	13	37	49
1766	10	15	16	53	8	9	58	5	7	29	0	31	0	21	40	37
1767	29	12	49	38	8	28	20	17	7	4	37	37	2	0	23	38
1768	17	21	33	9	8	17	36	9	5	14	25	42	2	8	26	25
1769	7	6	26	46	8	6	52	1	3	24	13	47	2	16	29	13
1770	26	3	59	26	8	25	14	13	2	29	50	53	3	25	12	14
1771	15	12	28	28	8	14	30	5	1	9	38	58	4	3	15	1
1772	3	21	36	39	8	3	45	57	11	19	27	3	4	11	17	48
1773	22	19	9	19	8	22	8	9	10	25	4	9	5	20	0	50
1774	12	3	57	55	8	11	24	1	9	4	52	14	5	28	3	27
1775	1	12	46	31	8	0	39	53	7	14	40	19	6	6	6	34
1776	19	10	19	12	8	19	2	5	6	20	17	25	7	14	49	25
1777	8	19	7	48	8	8	17	57	5	0	5	30	7	22	52	12
1778	27	16	40	28	8	26	40	1	4	5	42	36	9	1	35	13
1779	17	1	29	4	8	15	56	1	2	15	30	41	9	9	38	40
1780	5	10	17	40	8	5	11	53	0	25	18	46	9	17	40	47
1781	24	7	50	21	8	23	34	5	0	0	55	52	10	26	23	48
1782	13	16	38	57	8	12	49	58	10	10	43	57	11	4	26	35
1783	3	1	27	33	8	2	50	8	8	20	32	2	11	12	29	22
1784	20	23	0	13	8	20	28	3	9	26	9	8	0	21	12	23
1785	10	7	48	50	8	9	43	55	6	5	57	13	0	29	15	10
1786	9	5	21	30	8	28	6	7	5	11	34	19	2	7	58	12
1787	18	14	10	6	8	17	21	59	3	21	22	24	2	16	0	59
1788	6	22	58	42	8	6	37	51	2	1	10	29	2	24	3	46
1789	25	20	31	23	8	25	0	3	1	6	47	35	4	2	46	48
1790	15	5	19	55	8	14	15	55	11	16	35	40	4	10	49	35
1791	4	14	8	35	8	3	31	47	9	26	23	45	4	18	52	22
1792	22	11	41	15	8	21	53	59	9	2	0	52	5	27	35	24
1793	11	20	29	51	8	11	9	51	7	11	48	57	6	5	38	11
1794	30	18	2	32	8	29	32	3	6	17	26	4	7	14	21	C
1795	20	2	51	8	8	18	47	55	4	27	14	9	7	22	24	3
1796	8	11	39	44	8	8	3	47	3	7	2	14	8	0	26	47
1797	27	9	12	24	8	26	25	59	2	12	39	19	9	9	9	48
1798	16	18	1	1	8	15	41	51	0	22	27	25	9	17	12	35
1799	6	2	49	37	8	4	57	43	11	2	15	30	9	25	15	22
1800	25	0	22	17	8	23	19	55	10	7	52	30	11	3	58	24

TABLE III. Mean Anomalies, and Sun's mean Distance from the Node, for 13½ mean Lunations.

N	Mean Lunations.				Sun's mean Anomaly.				Moon's mean Anomaly.				Sun's mean Dist. from the Node.			
	D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"
1	29	12	44	3	0	29	6	19	0	25	49	0	1	0	40	14
2	59	1	28	6	1	28	12	39	1	21	38	1	2	1	20	28
3	88	14	12	9	2	27	18	58	2	17	27	1	3	2	0	42
4	118	2	56	12	3	26	25	17	3	13	16	2	4	2	40	56
5	147	15	40	15	4	25	31	37	4	9	5	2	5	3	21	10
6	177	4	24	18	5	24	37	56	5	4	54	3	6	4	1	24
7	206	17	8	21	6	23	44	15	6	0	43	3	7	4	41	38
8	236	5	52	24	7	22	50	35	6	26	32	3	8	5	21	52
9	265	18	36	27	8	21	56	54	7	22	21	4	9	6	2	6
10	295	7	20	30	9	21	3	14	8	18	10	4	10	6	42	20
11	324	20	4	33	10	20	9	33	9	13	59	5	11	7	22	34
12	354	8	48	36	11	19	15	52	10	9	48	5	0	8	2	47
13	383	21	32	40	0	18	22	12	11	5	37	0	1	8	43	1
14	412	18	22	2	0	14	33	10	6	12	54	30	0	15	20	7

TABLE IV. The Days of the Year, reckoned from the beginning of March.

Days.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Decem.	Januar.	Febr.
1	132	62	93	123	154	185	215	246	276	307	337	338
2	233	63	94	124	155	186	216	247	277	308	338	339
3	334	64	95	125	156	187	217	248	278	309	339	340
4	435	65	96	126	157	188	218	249	279	310	340	341
5	536	66	97	127	158	189	219	250	280	311	341	342
6	637	67	98	128	159	190	220	251	281	312	342	343
7	738	68	99	129	160	191	221	252	282	313	343	344
8	839	69	100	130	161	192	222	253	283	314	344	345
9	940	70	101	131	162	193	223	254	284	315	345	346
10	1041	71	102	132	163	194	224	255	285	316	346	347
11	1142	72	103	133	164	195	225	256	286	317	347	348
12	1243	73	104	134	165	196	226	257	287	318	348	349
13	1344	74	105	135	166	197	227	258	288	319	349	350
14	1445	75	106	136	167	198	228	259	289	320	350	351
15	1546	76	107	137	168	199	229	260	290	321	351	352
16	1647	77	108	138	169	200	230	261	291	322	352	353
17	1748	78	109	139	170	201	231	262	292	323	353	354
18	1849	79	110	140	171	202	232	263	293	324	354	355
19	1950	80	111	141	172	203	233	264	294	325	355	356
20	2051	81	112	142	173	204	234	265	295	326	356	357
21	2152	82	113	143	174	205	235	266	296	327	357	358
22	2253	83	114	144	175	206	236	267	297	328	358	359
23	2354	84	115	145	176	207	237	268	298	329	359	360
24	2455	85	116	146	177	208	238	269	299	330	360	361
25	2556	86	117	147	178	209	239	270	300	331	361	362
26	2657	87	118	148	179	210	240	271	301	332	362	363
27	2758	88	119	149	180	211	241	272	302	333	363	364
28	2859	89	120	150	181	212	242	273	303	334	364	365
29	2960	90	121	151	182	213	243	274	304	335	365	366
30	3061	91	122	152	183	214	244	275	305	336	366	367
31	3162	92	123	153	184	215	245	276	306	337	367	368

TABLE V. *Mean Lunations from 1 to 100000.*

Lunat.	Days. Decimal Parts.	Days	Hour.	M.	S.	Th.	Po.
1	29.530590851080	=	29	12	44	3	2 58
2	59.061181702160		59	1	28	6	5 57
3	88.591772553240		88	14	12	9	8 55
4	118.12363404320		118	2	56	12	11 53
5	147.652954255401		147	15	40	15	14 52
6	177.183545106481		177	4	24	18	17 50
7	206.714135957561		206	17	8	21	20 45
8	236.244726808641		236	5	52	24	23 47
9	265.775317659722		265	18	36	27	26 45
10	295.30590851080		295	7	20	30	29 43
20	590.61181702160		590	14	01	0	59 26
30	885.91772553240		885	22	1	31	29 10
40	1181.22363404320		1181	5	22	1	58 53
50	1476.2954255401		1476	12	42	32	28 36
60	1771.83545106481		1771	20	3	2	58 19
70	2067.14135957561		2067	3	23	33	28 2
80	2362.44726808641		2362	10	44	3	57 46
90	2657.75317659722		2657	18	4	34	27 29
100	2953.0590851080		2953	1	25	4	57 12
200	5906.1181702160		5906	2	50	9	54 24
300	8859.1772553240		8859	4	15	14	51 36
400	11812.2363404320		11812	5	40	19	48 48
500	14765.2954255401		14765	7	5	24	46 0
600	17718.3545106481		17718	8	30	29	43 12
700	20671.4135957561		20671	9	55	34	40 24
800	23624.4726808641		23624	11	20	39	37 36
900	26577.5317659722		26577	12	45	44	34 48
1000	29530.590851080		29530	14	10	49	32 0
2000	59061.181702160		59061	4	21	39	4 0
3000	88591.772553240		88591	18	32	28	36 0
4000	118122.2363404320		118122	8	43	18	8
5000	147652.054255401		147652	22	54	7	40 0
6000	177183.545106481		177183	13	4	57	12 0
7000	206714.135957561		206714	3	15	46	44 0
8000	236244.726808641		236244	17	26	36	16 0
9000	265775.317659722		265775	7	37	23	48 0
10000	295305.90851080		295305	21	48	15	20 0
20000	590611.81702160		590611	19	36	30	40 0
30000	885917.72553240		885917	17	24	46	0 0
40000	1181223.63404320		1181223	13	13	1	20 0
50000	1476529.54255401		1476529	1	1	16	40 0
60000	1771835.45106481		1771835	10	49	32	0 0
70000	2067141.35957561		2067141	8	37	47	20 0
80000	2362447.26808641		2362447	6	25	2	40 0
90000	2657753.17659722		2657753	4	14	18	0 0
100000	2953059.0851080		2953059	2	2	23	20 0

TABLE VI. *The first mean New Moon, with the mean Anomalies of the Sun and Moon, and the Sun's mean Distance from the Ascending Node, next after complete Centuries of Julian years.*

[illegible]

Luna- tions.	Julian Years.	First New Moon.				Sun's mean Anomaly.		M.'s mean Anomaly.		Sun from Node.				
		D. H. M. S.				s o '		s o '		s o '				
11132	900	9	12	53	47	0	1	4	3	22	29	4	24	25
12369	1000	13	21	4	40	0	4	25	0	7	51	9	13	53
13606	1100	18	5	15	32	0	7	46	8	23	13	2	3	20
14843	1200	22	13	26	24	0	11	7	5	8	35	6	22	47
16080	1300	26	21	37	16	0	14	28	1	23	57	11	12	15
17316	1400	1	17	4	6	11	18	43	9	13	30	3	1	1
18553	1500	6	1	14	58	11	22	4	5	28	52	7	20	27
19790	1600	10	9	25	50	11	25	25	5	14	14	0	9	56
21027	1700	14	17	36	42	11	28	46	10	29	36	4	29	23
22264	1800	19	1	47	35	0	2	8	7	14	58	9	18	51
23501	1900	23	9	58	27	0	5	29	4	0	20	2	8	18
24738	2000	27	18	9	19	0	8	50	0	15	42	6	27	45
25974	2100	31	13	36	8	11	13	5	8	5	15	10	16	32
27211	2200	6	21	47	1	11	16	26	4	20	37	3	6	0
28448	2300	11	5	57	53	11	19	47	1	5	59	7	25	27
29685	2400	15	14	8	45	11	23	8	9	21	21	0	14	54
30922	2500	19	22	19	38	11	26	29	6	6	43	5	4	22
32159	2600	24	6	30	30	11	29	50	2	22	4	9	23	49
33396	2700	28	14	41	22	0	3	11	11	7	26	2	13	16
34632	2800	3	10	8	11	11	7	26	6	26	59	6	2	3
35869	2900	7	18	19	3	11	10	47	3	12	21	10	21	30
37106	3000	12	2	29	56	11	14	8	11	24	33	3	10	58
38343	3100	16	10	40	48	11	17	30	8	13	5	8	0	25
39580	3200	20	18	51	40	11	20	51	4	28	27	0	19	52
40817	3300	25	3	2	33	11	24	12	1	13	49	5	9	20
42054	3400	29	11	13	25	11	27	33	9	29	11	9	28	47
43291	3500	4	6	40	14	11	1	48	5	18	44	1	17	34
44527	3600	8	14	51	6	11	5	9	2	4	6	6	7	1
45764	3700	12	23	1	59	11	8	30	10	19	28	10	26	29
47001	3800	17	7	12	51	11	11	51	7	4	50	3	15	56
48238	3900	21	15	23	43	11	15	12	3	20	12	8	5	23
49475	4000	25	23	34	35	11	18	33	0	5	34	0	24	50
50711	4100	0	19	1	25	10	22	48	7	25	7	4	13	37
51948	4200	5	3	12	17	10	26	9	4	10	25	9	3	5
53185	4300	9	11	23	9	10	29	31	0	25	51	1	22	32
54422	4400	13	19	34	1	11	2	52	9	11	13	6	11	59
55659	4500	18	3	44	54	11	6	13	5	26	35	11	1	27
56896	4600	22	11	55	46	11	9	34	2	11	57	3	20	54
58133	4700	26	20	6	38	11	12	55	10	27	19	8	10	21
59370	4800	1	15	33	27	10	17	9	6	16	52	11	29	8
60606	4900	5	23	44	20	10	20	31	3	2	14	9	18	36
61843	5000	10	7	55	12	10	23	52	11	17	36	4	8	3
63080	5100	14	16	6	4	10	27	13	8	2	58	1	27	30
64317	5200	19	0	16	56	10	3	4	4	18	20	6	16	57
65554	5300	23	8	27	49	11	3	55	1	3	42	11	6	25
66791	5400	27	16	38	41	11	7	16	9	19	4	2	25	52
68028	5500	2	12	5	30	10	11	31	5	8	37	7	14	39
69265	5600	6	20	16	22	10	14	52	1	23	59	0	4	6
70502	5700	11	4	27	15	10	18	14	10	9	21	4	23	34
71739	5800	15	12	38	7	10	21	35	6	24	43	9	13	1
72976	5900	19	20	48	59	10	24	56	3	10	5	2	2	28
74212	6000	24	4	59	52	10	28	17	11	25	27	6	21	55

TABLE VII. *The annual, or first Equation of the mean to the true Syzygy.*

Argument. Sun's mean Anomaly.

Subtract.

Degrees	0	1	2	3	4	5	Degrees
	Sigs	Sign	Sigs	Sigs	Sigs	Sigs	
	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	
0	0 0 0	2 3 12	3 35 0	4 10 53	3 39 30	2 7 45	30
1	0 4 18	2 6 55	3 37 10	4 10 57	3 37 19	2 3 55	29
2	0 8 35	2 10 36	3 39 18	4 10 55	3 35 6	2 0 12	28
3	0 12 51	2 14 15	3 41 23	4 10 49	3 32 50	1 56 57	27
4	0 17 8	2 17 52	3 43 26	4 10 39	3 30 30	1 52 6	26
5	0 21 24	2 21 27	3 45 25	4 10 24	3 28 5	1 48 4	25
6	0 25 39	2 25 9	3 47 19	4 10 4	3 25 35	1 41 1	24
7	0 28 55	2 28 29	3 49 7	4 9 39	3 23 1	1 39 56	23
8	0 34 11	2 31 57	3 50 54	4 9 10	3 20 20	1 35 49	22
9	0 38 26	2 35 22	3 52 29	4 8 37	3 17 35	1 31 41	21
10	0 42 39	2 38 44	3 54 4	4 7 59	3 14 49	1 27 31	20
11	0 46 52	2 42 3	3 55 35	4 7 16	3 11 59	1 23 19	19
12	0 51 4	2 45 18	3 57 24	4 6 29	3 9 6	1 19 5	18
13	0 55 17	2 48 30	3 58 27	4 5 37	3 6 10	1 14 49	17
14	0 59 27	2 51 40	3 59 49	4 4 41	3 3 10	1 10 32	16
15	1 3 36	2 54 48	3 1 7	4 3 40	3 0 57	1 6 15	15
16	1 7 45	2 57 53	4 2 18	4 2 35	2 57 0	1 1 56	14
17	1 11 53	3 0 54	4 3 24	4 1 26	2 53 49	0 57 36	13
18	1 16 0	3 3 51	4 4 22	4 0 12	2 50 36	0 53 15	12
19	1 20 6	3 6 45	4 5 18	3 58 52	2 47 18	0 48 52	11
20	1 24 10	3 9 36	4 6 10	3 57 27	2 43 57	0 44 28	10
21	1 28 12	3 12 24	4 6 58	3 55 59	2 40 33	0 40 2	9
22	1 32 12	3 15 9	4 7 41	3 54 26	2 37 6	0 35 36	8
23	1 36 10	3 17 51	4 8 22	3 52 49	2 33 35	0 31 10	7
24	1 40 6	3 20 30	4 8 57	3 51 9	2 30 2	0 26 44	6
25	1 44 1	3 23 5	4 9 29	3 49 26	2 26 26	0 22 17	5
26	1 47 54	3 25 36	4 9 55	3 47 38	2 22 47	0 17 50	4
27	1 51 46	3 28 3	4 10 16	3 45 44	2 19 5	0 13 23	3
28	1 55 37	3 30 26	4 10 33	3 43 45	2 15 20	0 8 56	2
29	1 59 26	3 32 45	4 10 45	3 41 40	2 11 35	0 4 29	1
30	2 3 12	3 35 0	4 10 53	3 39 30	2 7 45	0 0 0	0
Deg.	11 Sigs	10 Sigs	9 Sigs	8 Sigs	7 Sigs	6 Sigs	Deg.

Add

TABLE VIII. *Equation of the Moon's mean Anomaly.*

Argument. Sun's mean Anomaly.

Subtract.

Degrees	1		2		3		4		5		Degrees	
	Signs		Sign		Signs		Signs		Signs			
	°	' "	°	' "	°	' "	°	' "	°	' "		
0	0	0	0	46 45	1	21 32	1	35	1	23 4	0	48 19
1	0	1 37	48 10	1	22 21	1	35 2	1	22 14	0	46 51	29
2	0	3 13	49 34	1	23 10	1	35 1	1	21 24	0	45 23	28
3	0	4 52	50 53	1	23 57	1	35 0	1	20 32	0	43 54	27
4	0	6 28	52 19	1	24 41	1	34 57	1	19 38	0	42 24	26
5	0	8 0	53 40	1	25 24	1	34 50	1	18 42	0	40 53	25

[illegible]

Add

TABLE IX. *The second Equation of the mean to the true Syzygy*

Argument. Moon's equated Anomaly.

Add

Table																			
Degrees	°		1		2		3		4		5		Degrees						
	Signs		Sign		Signs		Signs		Signs		Signs								
	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.							
0	0	0	0	5	12	48	8	47	8	9	46	44	8	8	59	4	34	33	30
1	10	58	5	21	56	8	51	45	9	45	3	8	3	12	4	26	1	29	
2	21	56	30	57	8	56	10	9	44	12	7	57	23	4	17	25	48	27	
3	32	54	55	39	51	9	0	25	9	45	11	7	51	33	8	47	27	27	
4	43	52	58	48	37	9	4	31	9	42	59	7	45	40	4	7	26	26	
5	54	50	55	57	17	9	8	25	9	41	36	7	39	46	3	51	23	25	
6	1	5	48	6	5	51	9	12	9	40	3	7	33	36	3	42	32	24	
7	1	16	46	6	14	19	9	15	43	9	38	19	7	27	22	3	33	38	23
8	1	27	44	6	22	41	9	19	5	36	24	7	21	2	3	24	42	22	
9	1	38	40	6	30	57	9	22	14	9	34	18	7	14	30	3	15	44	21
10	1	49	33	6	39	49	9	25	12	9	32	1	7	7	50	3	6	45	20
11	2	0	23	6	47	0	9	27	54	9	29	33	7	1	2	57	43	19	
12	2	11	10	6	54	46	9	30	32	9	26	54	6	54	8	52	48	39	18
13	2	21	54	7	2	24	9	32	58	9	24	4	6	47	9	2	39	34	17
14	2	32	34	7	9	52	9	35	12	9	21	3	6	40	6	2	30	28	16
15	2	43	9	7	17	9	9	37	14	9	17	51	6	32	56	21	19		

TABLE IX. *Concluded.*

Degrees	1		2		3		4		5		Degrees									
	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs											
H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.									
0	0	0	5	12	48	47	8	9	46	24	8	59	4	34	33	42				
16	2	53	38	7	24	19	39	8	14	28	6	25	40	2	12	8	14			
17	3	4	37	31	18	40	51	9	10	54	6	18	18	2	53	13	13			
18	3	14	24	37	38	9	42	21	9	7	9	6	10	49	1	53	36	12		
19	3	24	42	47	44	51	43	42	10	3	13	6	3	16	44	1	53	16	11	
20	3	34	58	7	51	24	44	53	8	59	6	55	38	1	34	54	10	10	9	
21	3	45	11	7	57	45	52	8	54	50	5	47	54	1	25	31	9	8	8	
22	3	55	21	8	3	56	46	58	50	24	5	40	4	1	16	7	8	7	7	
23	4	5	26	8	9	57	47	13	45	48	5	32	9	1	6	41	7	6	6	
24	4	15	26	15	46	47	30	8	41	2	54	24	9	57	13	6	5	5	5	
25	4	25	20	8	21	24	47	49	8	26	6	5	16	5	47	44	5	4	4	
26	4	35	6	8	26	53	47	54	8	31	5	7	56	5	38	13	4	3	3	
27	4	44	42	8	32	11	47	46	8	25	44	59	42	5	28	41	3	2	2	
28	4	54	11	8	37	19	47	33	8	20	18	4	51	15	19	8	2	1	1	
29	5	3	33	8	42	18	47	14	8	14	33	43	2	5	9	34	1	0	0	
30	5	12	48	7	47	8	45	48	8	59	4	34	33	5	0	0	0	0	0	0
11	10	9	8	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0
Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs

TABLE X. *The third equation of the mean to the true Syzygy.*

Argument, Sun's Anomaly.—
Moon's Anomaly.

Degrees	1		2		3		Degrees
	Sub.	Add.	Sub.	Add.	Sub.	Add.	
	M.	S.	M.	S.	M.	S.	
	0	0	2	24	4	12	
1	0	5	2	26	4	15	29
2	0	10	2	30	4	18	26
3	0	15	2	34	4	21	27
4	0	20	2	38	4	24	26
5	0	25	2	42	4	27	25
6	0	30	2	46	4	30	24
7	0	35	2	50	4	32	23
8	0	40	2	54	4	34	22
9	0	45	2	58	4	36	21
10	0	50	3	2	4	38	20
11	0	55	3	6	4	40	19
12	1	0	3	10	4	42	18
13	1	5	3	14	4	44	17
14	1	10	3	18	4	46	16
15	1	15	3	22	4	48	15
16	1	20	3	26	4	50	14
17	1	25	3	30	4	52	13
18	1	30	3	34	4	54	12
19	1	35	3	38	4	56	11
20	1	40	3	42	4	58	10
21	1	45	3	46	4	60	9
22	1	50	3	50	4	62	8
23	1	55	3	54	4	64	7
24	1	60	3	58	4	66	6
25	2	0	3	62	4	68	5
26	2	4	4	0	4	70	4
27	2	9	4	5	4	72	3
28	2	14	4	10	4	74	2
29	2	19	4	15	4	76	1
30	2	24	4	20	4	78	0
Degrees	Signs		Signs		Signs		Degrees
5	Sub.	4	Sub.	3	Sub.	4	5
11	Add.	10	Add.	9	Add.	10	11

TABLE XIII. Equation of the Sun's centre, or the difference between his mean and true place.

Argument. Sun's mean Anomaly.

Subtract																																				
Degrees	0 Signs			1 Sign			2 Signs			3 Signs			4 Signs			5 Signs			Degrees																	
	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2																		
	0	0	0	5	6	4	1	3	9	6	1	5	5	3	7	1	4	1		2	0	5	8	3	3											
1	0	1	5	9	0	5	8	3	0	1	4	0	7	1	5	5	3	9	1	4	0	1	2	0	5	7	7	7	0							
2	0	3	5	7	1	0	1	2	1	4	1	6	1	5	5	3	8	1	3	9	1	0	1	0	5	5	1	9	2	0						
3	0	5	5	6	1	1	5	3	1	4	2	3	1	5	5	3	6	1	3	8	6	0	5	3	0	3	2	0	1	0						
4	0	7	5	4	1	3	3	3	1	4	2	5	9	1	5	5	3	1	3	7	0	5	1	4	0	2	0	1	0	0						
5	0	9	5	2	1	5	1	2	1	4	3	5	2	1	5	5	2	1	3	5	5	2	0	4	9	4	9	2	0	0						
6	0	11	5	0	1	6	5	0	1	4	4	4	1	5	5	1	5	1	3	4	4	3	0	4	7	5	7	2	0	0						
7	0	13	4	8	1	8	2	7	1	4	5	3	4	1	5	5	3	1	3	3	3	2	0	4	6	5	2	0	1	0						
8	0	15	4	6	1	10	2	1	4	6	2	2	1	5	4	5	0	1	3	2	1	9	4	4	4	1	1	0	1	0						
9	0	17	4	3	1	11	3	6	1	4	7	8	1	5	4	3	5	1	3	1	4	2	0	4	2	1	6	2	0	0						
10	0	19	4	0	1	13	9	1	4	7	5	3	1	5	4	1	7	1	2	9	4	7	0	4	0	2	1	0	1	0						
11	0	21	3	7	1	14	4	1	4	8	3	5	1	5	3	5	7	1	2	8	2	9	0	3	8	2	5	0	1	0						
12	0	23	3	3	1	16	11	1	4	9	1	5	1	5	3	6	1	2	7	9	0	3	6	2	8	1	3	0	1	0						
13	0	25	2	9	1	17	4	0	1	4	9	5	1	5	3	1	2	1	2	5	4	8	0	3	4	3	0	1	0	0						
14	0	27	2	5	1	19	8	1	5	0	3	0	1	5	2	4	6	1	2	4	5	0	0	3	2	3	2	0	1	0						
15	0	29	2	0	1	20	3	4	1	5	1	5	1	5	2	1	8	1	2	3	0	0	0	3	0	3	3	1	0	0						
16	0	31	1	5	1	21	5	9	1	5	1	3	7	1	5	1	4	8	1	2	1	3	4	0	2	8	3	3	1	0	0					
17	0	33	9	1	23	2	2	2	1	5	2	8	1	5	1	1	5	1	2	0	6	0	2	6	2	4	3	3	1	0	0					
18	0	35	3	2	1	24	4	4	1	5	2	3	6	1	5	0	4	1	1	8	3	6	0	2	4	3	3	1	0	0						
19	0	36	5	5	1	26	5	1	5	3	3	1	5	0	5	1	7	5	1	7	5	0	0	2	2	3	1	0	1	0						
20	0	38	4	7	1	27	2	4	1	5	3	2	7	1	4	9	2	6	1	5	3	3	0	2	0	3	0	1	0	0						
21	0	40	3	0	1	28	4	1	5	3	5	0	1	4	8	4	0	1	3	5	9	0	0	1	8	2	8	0	1	0						
22	0	42	3	0	1	29	5	7	1	5	4	0	1	4	8	3	1	2	4	0	1	2	0	0	1	6	2	6	0	0						
23	0	44	2	0	1	31	1	1	1	5	4	2	8	1	4	7	1	9	1	0	4	7	0	0	1	4	2	4	0	0						
24	0	46	9	1	32	2	5	1	5	4	4	4	1	4	6	3	2	1	9	9	0	1	2	1	0	1	2	1	0	0						
25	0	47	5	7	1	33	3	5	1	5	4	5	1	4	5	4	1	7	2	9	0	0	0	1	0	1	8	5	0	0						
26	0	49	4	5	1	34	4	5	1	5	5	0	1	4	4	5	3	1	5	4	9	0	0	8	1	4	4	0	1	0						
27	0	51	3	2	1	35	5	3	1	5	5	2	0	4	4	1	1	4	7	0	6	1	1	0	6	1	1	0	1	0						
28	0	53	5	1	1	36	5	9	1	5	5	2	8	1	4	3	7	1	2	2	4	0	4	7	2	4	0	1	0	0						
29	0	55	3	1	1	38	3	1	5	5	3	1	4	2	1	0	1	0	0	3	9	0	2	4	0	1	0	1	0	0						
30	0	56	4	7	1	39	6	1	5	5	3	7	1	4	1	1	2	0	5	8	5	3	0	0	0	0	1	0	1	0						
0	11 Signs			10 Signs			9 Signs			8 Signs			7 Signs			6 Signs			5 Signs			4 Signs			3 Signs			2 Signs			1 Sign			0 Signs		
Add																																				

Add

TABLE XIV. The Sun's Declination.

Argument. Sun's true Place.

Degrees		Signs						Degrees	
		0	1	2	3	4	5		
		N.	N.	N.	N.	N.	N.		
		0	1	2	3	4	5		
0	0	0	11	30	20	11	30	0	0
1	0	24	11	51	20	24	29	16	6
2	0	48	12	11	20	36	28	17	6
3	1	12	12	32	20	48	27	18	7
4	1	36	12	53	20	59	26	19	7
5	1	59	13	13	21	10	25	20	7
6	2	23	13	33	21	21	24	21	8
7	2	47	13	53	21	31	23	22	8
8	3	14	14	12	21	41	22	23	9
9	3	34	14	31	21	50	21	24	9
10	3	58	14	50	21	59	20	25	9
11	4	22	15	9	22	8	19	26	10
12	4	45	15	28	22	16	18	27	10
13	5	9	15	46	22	24	17	28	10
14	5	32	16	4	22	31	16	29	11
15	5	5	16	22	22	38	15	30	11
16	6	18	16	39	22	45	14	31	11
17	6	41	16	56	22	52	13	32	11
18	7	6	17	14	23	0	12	33	12
19	7	27	17	31	23	0	11	34	12
20	7	50	17	46	23	0	10	35	12
21	8	6	18	13	23	11	9	36	13
22	8	35	18	30	23	18	8	37	13
23	8	57	18	45	23	25	7	38	13
24	9	20	18	4	23	31	6	39	14
25	9	42	19	19	23	37	5	40	14
26	10	4	19	36	23	43	4	41	14
27	10	25	19	51	23	49	3	42	14
28	10	47	19	5	23	55	2	43	15
29	11	8	19	58	23	0	1	44	15
30	11	30	20	11	23	0	0	45	15
1	11	5	20	28	23	0	0	46	15
2	12	10	20	45	23	0	0	47	15
3	12	34	20	59	23	0	0	48	15
4	13	6	20	11	23	0	0	49	15
5	13	25	20	28	23	0	0	50	15

TABLE XV. Equation of the Sun's mean Distance from the Node.

Argument. Sun's mean Anomaly.

Degrees		Subtract										Degrees	
		0	1	2	3	4	5	6	7	8	9		
		Signs	Sign	Signs	Signs	Signs	Signs	Signs	Signs	Signs	Signs		
		0	1	2	3	4	5	6	7	8	9		
0	0	0	0	1	1	1	1	1	1	1	1	0	0
1	0	1	1	1	1	1	1	1	1	1	1	0	0
2	0	2	1	1	1	1	1	1	1	1	1	0	0
3	0	3	1	1	1	1	1	1	1	1	1	0	0
4	0	4	1	1	1	1	1	1	1	1	1	0	0
5	0	5	1	1	1	1	1	1	1	1	1	0	0
6	0	6	1	1	1	1	1	1	1	1	1	0	0
7	0	7	1	1	1	1	1	1	1	1	1	0	0
8	0	8	1	1	1	1	1	1	1	1	1	0	0
9	0	9	1	1	1	1	1	1	1	1	1	0	0
10	0	10	1	1	1	1	1	1	1	1	1	0	0
11	0	11	1	1	1	1	1	1	1	1	1	0	0
12	0	12	1	1	1	1	1	1	1	1	1	0	0
13	0	13	1	1	1	1	1	1	1	1	1	0	0
14	0	14	1	1	1	1	1	1	1	1	1	0	0
15	0	15	1	1	1	1	1	1	1	1	1	0	0
16	0	16	1	1	1	1	1	1	1	1	1	0	0
17	0	17	1	1	1	1	1	1	1	1	1	0	0
18	0	18	1	1	1	1	1	1	1	1	1	0	0
19	0	19	1	1	1	1	1	1	1	1	1	0	0
20	0	20	1	1	1	1	1	1	1	1	1	0	0
21	0	21	1	1	1	1	1	1	1	1	1	0	0
22	0	22	1	1	1	1	1	1	1	1	1	0	0
23	0	23	1	1	1	1	1	1	1	1	1	0	0
24	0	24	1	1	1	1	1	1	1	1	1	0	0
25	0	25	1	1	1	1	1	1	1	1	1	0	0
26	0	26	1	1	1	1	1	1	1	1	1	0	0
27	0	27	1	1	1	1	1	1	1	1	1	0	0
28	0	28	1	1	1	1	1	1	1	1	1	0	0
29	0	29	1	1	1	1	1	1	1	1	1	0	0
30	0	30	1	1	1	1	1	1	1	1	1	0	0

Add

TABLE XVI.

The Moon's

Latitude in E-

clipses.

Arg. Moon's

equated Dis-

tance from

the Node.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

0 Signs.

North Ascend.

6 Signs.

South Defect.

TABLE XVII. The Moon's horizontal Parallax, with the Semidiameters and true Hourly Motions of the Sun and Moon, to every sixth degree of their mean Anomalies, the quantities for the intermediate degrees being easily proportioned by sight.

Degrees		Horizontal Parallax			
---------	--	---------------------	--	--	--

1295, June 13th old style, at 12 h. 52 m. 59 sec. *post meridiem*, when the moon's shadow first touched the earth at the north pole; the fun being then $17^{\circ} 48' 27''$ from the ascending node. In each period since that time, the sun has come $28' 12''$ nearer and nearer the same node, and the moon's shadow has therefore gone more and more southerly.—In the year 1662, July 8th old style, at 10 h. 36 m. 21 sec. *p. m.* when the same eclipse will have returned 38 times, the sun will be only $24' 45''$ from the ascending node, and the centre of the moon's shadow will fall a little northward of the earth's centre.—At the end of the next following period, A. D. 1980, July 28th old style, at 18 h. 19 m. 41 sec. *p. m.* the sun will have receded back $3' 27''$ from the ascending node, and the moon will have a very small degree of southern latitude, which will cause the centre of her shadow to pass a very small matter south of the earth's centre.—After which, in every following period, the sun will be $28' 12''$ farther back from the ascending node than in the period last before; and the moon's shadow will go still farther and farther southward, until September 12th old style, at 23 h. 46 m. 22 sec. *p. m.* A. D. 2665; when the eclipse will have completed its 77th periodical return, and will go quite off the earth at the south pole (the sun being then $17^{\circ} 55' 22''$ back from the node), and cannot come in at the north pole, so as to begin the same course over again, in less than 12,492 years afterwards.—And such will be the case of every other eclipse of the sun: For, as there is about 18 degrees on each side of the node within which there is a possibility of eclipses, their whole revolution goes through 36 degrees about that node, which, taken from 360 degrees, leaves remaining 324 degrees for the eclipses to travel in *expansum*. And as this 36 degrees is not gone through in less than 77 periods, which takes up 1388 years, the remaining 324 degrees cannot be so gone through in less than 12,492 years. For, as 36 is to 1388, so is 324 to 12,492.

To illustrate this a little farther, we shall examine some of the most remarkable circumstances of the returns of the eclipse which happened July 14th 1748, about noon. This eclipse, after traversing the voids of space from the creation, at last began to enter the Terra Australis Incognita about 88 years after the conquest, which was the last of king Stephen's reign: every Chaldean period it has crept more northerly, but was still invisible in Britain before the year 1622; when, on the 30th of April, it began to touch the south parts of England about 2 in the afternoon; its central appearance rising in the American south seas, and traversing Peru and the Amazon's country, through the Atlantic ocean into Africa, and setting in the Æthiopian continent, not far from the beginning of the Red sea.

Its next visible period was, after three Chaldean revolutions, in 1676, on the first of June, rising central in the Atlantic ocean, passing us about 9 in the morning, with four digits eclipsed on the under limb, and setting in the gulf of CochinChina in the East Indies.

It being now near the solstice, this eclipse was visible the very next return in 1694, in the evening; and in two periods more, which was in 1730, on the 4th of July, was seen about half eclipsed just after sun-rise, and observed both at Wirtemberg in Germany, and Pekin

in China, soon after which it went off.

Eighteen years more afforded us the eclipse which fell on the 14th of July 1748.

The next visible return happened on July 25th 1766 in the evening, about four digits eclipsed; and, after two periods more, will happen on August 16th 1802, early in the morning, about five digits, the centre coming from the north frozen continent, by the capes of Norway, through Tartary, China, and Japan, to the Ladrone islands, where it goes off.

Again, in 1820, August 26th, between one and two, there will be another great eclipse at London, about 10 digits; but, happening so near the equinox, the centre will leave every part of Britain to the west, and enter Germany at Emden, passing by Venice, Naples, Grand Cairo, and set in the gulf of Bassora near that city.

It will be no more visible till 1874, when five digits will be obscured (the centre being now about to leave the earth) on September 28th. In 1892, the sun will go down eclipsed in London; and again, in 1928, the passage of the centre will be in the *expansum*, tho' there will be two digits eclipsed at London, October the 31st of that year, and about the year 2090 the whole penumbra will be wore off; whence no more returns of this eclipse can happen till after a revolution of 10,000 years.

From these remarks on the entire revolution of this eclipse, we may gather, that a thousand years more or less, (for there are some irregularities that may protract or lengthen this period 100 years), complete the whole terrestrial phenomena of any single eclipse: and since 20 periods of 54 years each, and about 33 days, comprehend the entire extent of their revolution, it is evident, that the times of the returns will pass thro' a circuit of one year and ten months, every Chaldean period being 10 or 11 days later, and of the equable appearances, about 32 or 33 days. Thus, though this eclipse happens about the middle of July, no other subsequent eclipse of this period will return till the middle of the same month again; but wear constantly each period 10 or 11 days forward, and at last appear in winter, but then it begins to cease from affecting us.

Another conclusion from this revolution may be drawn, that there will seldom be any more than two great eclipses of the sun in the interval of this period, and these follow sometimes next return, and often at greater distances. That of 1715 returned again in 1733 very great; but this present eclipse will not be great till the arrival of 1820, which is a revolution of four Chaldean periods; so that the irregularities of their circuits must undergo new computations to assign them exactly.

Nor do all eclipses come in at the south pole: that depends altogether on the position of the lunar nodes, which will bring in as many from the *expansum* one way as the other; and such eclipses will wear more southerly by degrees, contrary to what happens in the present case.

The eclipse, for example, of 1736 in September, had its centre in the *expansum*, and set about the middle of its obscurity in Britain; it will wear in at the north pole, and in the year 2600, or thereabouts, go off into the *expansum* on the south side of the earth.

The eclipses therefore which happened about the crea-

236
Period in which the phenomena of an eclipse are completed.

237
Eclipses come in by the north and south poles.

ation are little more than half way yet of their ethereal circuit; and will be 4000 years before they enter the earth any more. This grand revolution seems to have been entirely unknown to the ancients.

239
Very ancient eclipses cannot be calculated by our tables.

It is particularly to be noted, that eclipses which have happened many centuries ago will not be found by our present tables to agree exactly with ancient observations; by reason of the great anomalies in the lunar motions; which appears an incontestable demonstration of the non-eternity of the universe. For it seems confirmed by undeniable proofs, that the moon now finishes her period in less time than formerly, and will continue, by the centripetal law, to approach nearer and nearer the earth, and to go sooner and sooner round it: nor will the centrifugal power be sufficient to compensate the different gravitations of such an assemblage of bodies as constitute the solar system, which would come to ruin of itself, without some regulation and adjustment of their original motions. See N° 89.

We are credibly informed from the testimony of the ancients, that there was a total eclipse of the sun predicted by Thales to happen in the fourth year of the 48th Olympiad, either at Sardis or Miletus in Asia, where Thales then resided. That year corresponds to the 585th year before Christ; when accordingly there happened a very signal eclipse of the sun, on the 28th of May, answering to the present 10th of that month, central through North America, the fourth parts of France, Italy, &c. as far as Athens, or the isles in the Ægean sea; which is the farthest that even the Caroline tables carry it; and consequently make it invisible to any part of Asia, in the total character; tho' there are good reasons to believe that it extended to Babylon, and went down central over that city. We are not however to imagine, that it was let before it past Sardis and the Asiatic towns, where the predictor lived; because an invisible eclipse could have been of no service to demonstrate his ability in astronomical sciences to his countrymen, as it could give no proof of its reality.

For a further illustration, Thucydides relates, That a solar eclipse happened on a summer's day, in the afternoon, in the first year of the Peloponnesian war, so great, that the stars appeared. Rhodius was victor in the Olympic games the fourth year of the said war, being also the fourth year of the 87th Olympiad, on the 428th year before Christ. So that the eclipse must have happened in the 431st year before Christ; and by computation it appears, that on the third of August there was a signal eclipse which would have past over Athens, central about 6 in the evening, but which our present tables bring no farther than the ancient Syrtis on the African coast, above 400 miles from Athens; which, suffering in that case but 9 digits, could by no means exhibit the remarkable darkness recited by this historian: the centre therefore seems to have past Athens about 6 in the evening, and probably might go down about Jerusalem, or near it, contrary to the construction of the present tables. These things are only mentioned by way of caution to the present astronomers, in recomputing ancient eclipses; and they may examine the eclipse of Nicias, so fatal to the Athenian fleet; that which overthrew the Macedonian army, &c.

239
Number of
eclipses in a
year.

In any year, the number of eclipses of both luminaries cannot be less than two, nor more than seven;

the most usual number is four, and it is very rare to have more than six. For the sun passes by both the nodes but once a-year, unless he passes by one of them in the beginning of the year; and if he does, he will pass by the same node again a little before the year be finished; because, as these points move 19½ degrees backwards every year, the sun will come to either of them 173 days after the other. And when either node is within 17 degrees of the sun at the time of new moon, the sun will be eclipsed. At the subsequent opposition, the moon will be eclipsed in the other node, and come round to the next conjunction again ere the former node be 17 degrees past the sun, and will therefore eclipse him again. When three eclipses fall about either node, the like number generally falls about the opposite; as the sun comes to it in 173 days afterward; and six lunations contain but four days more. Thus, there may be two eclipses of the sun and one of the moon about each of her nodes. But when the moon changes in either of the nodes, she cannot be near enough the other node at the next full to be eclipsed; and in six lunar months afterward she will change near the other node: in these cases, there can be but two eclipses in a year, and they are both of the sun.

A longer period than the abovementioned, for comparing and examining eclipses which happen at long intervals of time, is 557 years, 21 days, 18 hours, 30 minutes, 11 seconds; in which time there are 6890 mean lunations; and the sun and node meet again so nearly as to be but 11 seconds distant; but then it is not the same eclipse that returns, as in the shorter period abovementioned.

Eclipses of the sun are more frequent than of the moon, because the sun's ecliptic limits are greater than the moon's; yet we have more visible eclipses of the moon than of the sun, because eclipses of the moon are seen from all parts of that hemisphere of the earth which is next her, and are equally great to each of those parts; but the sun's eclipses are visible only to that small portion of the hemisphere next him whereon the moon's shadow falls.

The moon's orbit being elliptical, and the earth in one of its focuses, she is once at her least distance from the earth, and once at her greatest, in every lunation. When the moon changes at her least distance from the earth, and so near the node that her dark shadow falls upon the earth, she appears big enough to cover the whole disk of the sun from that part on which her shadow falls; and the sun appears totally eclipsed there for some minutes: but when the moon changes at her greatest distance from the earth, and so near the node that her dark shadow is directed towards the earth, her diameter subtends a less angle than the sun's; and therefore she cannot hide his whole disk from any part of the earth, nor does her shadow reach it at that time; and to the place over which the point of her shadow hangs, the eclipse is annular, the sun's edge appearing like a luminous ring all around the body of the moon. When the change happens within 17 degrees of the node, and the moon at her mean distance from the earth, the point of her shadow just touches the earth, and she eclipseth the sun totally to that small spot whereon her shadow falls; but the darkness is not of a moment's continuance.

The moon's apparent diameter, when largest, exceeds

240
Why more
eclipses of
the moon
than of the
sun are ob-
served.

241
Total and
annular e-
clipses.

ceeds the sun's, when least, only 1 minute 38 seconds of a degree; and in the greatest eclipse of the sun that can happen at any time and place, the total darkness continues no longer than whilst the moon is going 1 minute 38 seconds from the sun in her orbit, which is about 3 minutes and 13 seconds of an hour.

The moon's dark shadow covers only a spot on the earth's surface about 180 English miles broad, when the moon's diameter appears largest, and the sun's least; and the total darkness can extend no farther than the dark shadow covers. Yet the moon's partial shadow or penumbra may then cover a circular space 4900 miles in diameter, within all which the sun is more or less eclipsed, as the places are less or more distant from the centre of the penumbra. When the moon changes exactly in the node, the penumbra is circular on the earth at the middle of the general eclipse; because at that time it falls perpendicularly on the earth's surface; but at every other moment it falls obliquely, and will therefore be elliptical; and the more so, as the time is longer before or after the middle of the general eclipse; and then much greater portions of the earth's surface are involved in the penumbra.

When the penumbra first touches the earth, the general eclipse begins; when it leaves the earth, the general eclipse ends: from the beginning to the end the sun appears eclipsed in some part of the earth or other. When the penumbra touches any place, the eclipse begins at that place, and ends when the penumbra leaves it. When the moon changes in the node, the penumbra goes over the centre of the earth's disk as seen from the moon; and consequently, by describing the longest line possible on the earth, continues the longest upon it; namely, at a mean rate, 5 hours 50 minutes; more, if the moon be at her greatest distance from the earth, because she then moves slowest; less, if she be at her least distance, because of her quicker motion.

To make several of the above and other phenomena plainer, (Plate L. fig. 3.), let *S* be the sun, *E* the earth, *M* the moon, and *AMP* the moon's orbit. Draw the right line *We* from the western side of the sun at *W*, touching the western side of the moon at *c*, and the earth at *e*: draw also the right line *Vd* from the eastern side of the sun at *V*, touching the eastern side of the moon at *d*, and the earth at *e*: the dark space *ced* included between those lines is the moon's shadow, ending in a point at *e*, where it touches the earth; because in this case the moon is supposed to change at *M* in the middle between *A* the apogee, or farthest point of her orbit from the earth, and *P* the perigee, or nearest point to it. For, had the point *P* been at *M*, the moon had been nearer the earth; and her dark shadow at *e* would have covered a space upon it about 180 miles broad, and the sun would have been totally darkened, with some continuance; but had the point *A* been at *M*, the moon would have been farther from the earth, and her shadow would have ended in a point a little above *e*, and therefore the sun would have appeared like a luminous ring all around the moon. Draw the right lines *WXdb* and *VXcg*, touching the contrary sides of the sun and moon, and ending on the earth at *a* and *b*: draw also the right line *SXM*, from the centre of the sun's disk, thro' the moon's centre, to the earth; and suppose the two former lines *WXdb* and *VXcg* to revolve on the

line *SXM* as an axis, and their points *a* and *b* will describe the limits of the penumbra *TT* on the earth's surface, including the large space *aba*; within which the sun appears more or less eclipsed, as the places are more or less distant from the verge of the penumbra *ab*.

Draw the right line *y12* across the sun's disk, perpendicular to *SXM* the axis of the penumbra: then divide the line *y12* into twelve equal parts, as in the figure, for the twelve digits or equal parts of the sun's diameter; and, at equal distances from the centre of the penumbra at *e* (on the earth's surface *YY*) to its edge *ab*, draw twelve concentric circles, marked with the numeral figures 1 2 3 4 &c. and remember that the moon's motion in her orbit *AMP* is from west to east, as from *s* to *t*. Then,

To an observer on the earth at *b*, the eastern limb of the moon at *d* seems to touch the western limb of the sun at *W*, when the moon is at *M*; and the sun's eclipse begins at *b*, appearing as at *A* in Plate LI. fig. 1. at the left hand; but, at the same moment of absolute time, to an observer at *a* in Plate L. fig. 3. the western edge of the moon at *c* leaves the eastern edge of the sun at *V*, and the eclipse ends, as at the right hand *C*, Plate LI. fig. 1. At the very same instant, to all those who live on the circle marked 1 on the earth *E*, in Plate L. fig. 3. the moon *M* cuts off or darkens a twelfth part of the sun *S*, and eclipses him one digit, as at 1 in Plate LI. fig. 1.: to those who live on the circle marked 2 in Plate L. fig. 3. the moon cuts off two twelfth parts of the sun, as at 2 in Plate LI. fig. 1.; to those on the circle 3, three parts; and so on to the centre at 12 in Plate L. fig. 3. where the sun is centrally eclipsed, as at *B* in the middle of fig. 1. Plate LI.; under which figure there is a scale of hours and minutes, to shew at a mean rate how long it is from the beginning to the end of a central eclipse of the sun on the parallel of London; and how many digits are eclipsed at any particular time from the beginning at *A* to the middle at *B*, or the end at *C*. Thus, in 16 minutes from the beginning, the sun is two digits eclipsed; in an hour and five minutes, eight digits; and in an hour and 37 minutes, 12 digits.

By Plate L. fig. 3. it is plain, that the sun is totally or centrally eclipsed but to a small part of the earth at any time, because the dark conical shadow *e* of the moon *M* falls but on a small part of the earth; and that the partial eclipse is confined at that time to the space included by the circle *ab*, of which only one half can be projected in the figure, the other half being supposed to be hid by the convexity of the earth *E*: and likewise, that no part of the sun is eclipsed to the large space *YY* of the earth, because the moon is not between the sun and any of that part of the earth; and therefore to all that part the eclipse is invisible. The earth turns eastward on its axis, as from *g* to *h*, which is the same way that the moon's shadow moves; but the moon's motion is much swifter in her orbit from *s* to *t*; and therefore, although eclipses of the sun are of longer duration on account of the earth's motion on its axis than they would be if that motion was stop, yet, in four minutes of time at most, the moon's swifter motion carries her dark shadow quite over any place that its centre touches at the time of

greatest obscuration. The motion of the shadow on the earth's disk is equal to the moon's motion from the sun, which is about $30\frac{1}{2}$ minutes of a degree every hour at a mean rate; but so much of the moon's orbit is equal to $30\frac{1}{2}$ degrees of a great circle on the earth; and therefore the moon's shadow goes $30\frac{1}{2}$ degrees, or 1830 geographical miles, on the earth in an hour, or $30\frac{1}{2}$ miles in a minute, which is almost four times as swift as the motion of a cannon-ball.

As seen from the sun or moon, the earth's axis appears differently inclined every day of the year, on account of keeping its parallelism throughout its annual course. In Plate LI. fig. 2. let EDON be the earth at the two equinoxes and the two solstices, NS its axis, N the north pole, S the south pole, $\mathcal{A}EQ$ the equator, T the tropic of Cancer, t the tropic of Capricorn, and ABC the circumference of the earth's enlightened disk as seen from the sun or new moon at these times. The earth's axis has the position NES at the vernal equinox, lying towards the right hand, as seen from the sun or new moon; its poles N and S being then in the circumference of the disk; and the equator and all its parallels seem to be straight lines, because their planes pass thro' the observer's eye looking down upon the earth from the sun or moon directly over E, where the ecliptic FG intersects the equator $\mathcal{A}E$. At the summer solstice, the earth's axis has the position NDS; and that part of the ecliptic FG, in which the moon is then new, touches the tropic of Cancer T at D. The north pole N at that time inclining $23\frac{1}{2}$ degrees towards the sun, falls so many degrees within the earth's enlightened disk, because the sun is then vertical to D $23\frac{1}{2}$ degrees north of the equator $\mathcal{A}EQ$; and the equator with all its parallels seem elliptic curves bending downward, or towards the south pole, as seen from the sun; which pole, together with $23\frac{1}{2}$ degrees all round it, is hid behind the disk in the dark hemisphere of the earth. At the autumnal equinox, the earth's axis has the position NOS, lying to the left hand as seen from the sun or new moon, which are then vertical to O, where the ecliptic cuts the equator $\mathcal{A}EQ$. Both poles now lie in the circumference of the disk, the north pole just going to disappear behind it, and the south pole just entering into it; and the equator, with all its parallels, seem to be straight lines, because their planes pass through the observer's eye, as seen from the sun, and very nearly so as seen from the moon. At the winter solstice, the earth's axis has the position NNS, when its south pole S inclining $23\frac{1}{2}$ degrees towards the sun, falls $23\frac{1}{2}$ degrees within the enlightened disk, as seen from the sun or new moon, which are then vertical to the tropic of Capricorn t , $23\frac{1}{2}$ degrees south of the equator $\mathcal{A}EQ$; and the equator, with all its parallels, seem elliptic curves bending upward; the north pole being as far hid behind the disk in the dark hemisphere, as the south pole is come into the light. The nearer that any time of the year is to the equinoxes or solstices, the more it partakes of the phenomena relating to them.

Thus it appears, that from the vernal equinox to the autumnal, the north pole is enlightened; and the equator and all its parallels appear elliptical as seen from the sun, more or less curved as the time is nearer to, or farther from, the summer solstice; and bending downwards, or towards the south pole; the reverse of

which happens from the autumnal equinox to the vernal. A little consideration will be sufficient to convince the reader, that the earth's axis inclines towards the sun at the summer solstice; from the sun at the winter solstice; and sideways to the sun at the equinoxes; but towards the right hand, as seen from the sun at the vernal equinox; and towards the left hand at the autumnal. From the winter to the summer solstice, the earth's axis inclines more or less to the right hand, as seen from the sun; and the contrary from the summer to the winter solstice.

The different positions of the earth's axis, as seen from the sun at different times of the year, affect solar eclipses greatly with regard to particular places; yea, so far as would make central eclipses which fall at one time of the year invisible if they fell at another, even though the moon should always change in the nodes, and at the same hour of the day; of which indefinitely various affections, we shall only give examples for the times of the equinoxes and solstices.

In the same diagram, (Plate LI. fig. 2.), let FG be part of the ecliptic, and IK, ik , ik , part of the moon's orbit; both seen edgewise, and therefore projected into right lines; and let the intersections NODE be one and the same node at the above times, when the earth has the forementioned different positions; and let the spaces included by the circles Pppp be the penumbra at these times, as its centre is passing over the centre of the earth's disk. At the winter solstice, when the earth's axis has the position NNS, the centre of the penumbra P touches the tropic of Capricorn t in N at the middle of the general eclipse; but no part of the penumbra touches the tropic of Cancer T. At the summer solstice, when the earth's axis has the position NDS (iDk being then part of the moon's orbit whose node is at D), the penumbra p has its centre at D, on the tropic of Cancer T, at the middle of the general eclipse, and then no part of it touches the tropic of Capricorn t . At the autumnal equinox, the earth's axis has the position NOS, (iOk being then part of the moon's orbit), and the penumbra equally includes part of both tropics T and t at the middle of the general eclipse: at the vernal equinox it does the same, because the earth's axis has the position NES; but, in the former of these two last cases, the penumbra enters the earth at A, north of the tropic of Cancer T, and leaves it at m , south of the tropic of Capricorn t ; having gone over the earth obliquely southward, as its centre described the line AOm ; whereas, in the latter case, the penumbra touches the earth at n , south of the equator $\mathcal{A}EQ$, and describing the line nEg (similar to the former line AOm in open space), goes obliquely northward over the earth, and leaves it at g , north of the equator.

In all these circumstances, the moon has been supposed to change at noon in her descending node: Had she changed in her ascending node, the phenomena would have been as various the contrary way, with respect to the penumbras going northward or southward over the earth. But because the moon changes at all hours, as often in one node as in the other, and at all distances from them both at different times as it happens, the variety of the phases of eclipses are almost innumerable, even at the same places; considering also how variously the same places are situated on the

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Eclipses affected by the position of the earth's axis.

enlightened disk of the earth, with respect to the penumbra's motion, at the different hours when eclipses happen.

When the moon changes 17 degrees short of her descending node, the penumbra P18 just touches the northern part of the earth's disk, near the north pole N; and as seen from that place, the moon appears to touch the sun, but hides no part of him from sight. Had the change been as far short of the ascending node, the penumbra would have touched the southern part of the disk near the south pole S. When the moon changes 12 degrees short of the descending node, more than a third part of the penumbra P12 falls on the northern parts of the earth at the middle of the general eclipse: Had she changed as far past the same node, as much of the other side of the penumbra about P would have fallen on the southern part of the earth; all the rest in the expanse, or open space. When the moon changes 6 degrees from the node, almost the whole penumbra P6 falls on the earth at the middle of the general eclipse. And lastly, when the moon changes in the node at N, the penumbra PN takes the longest course possible on the earth's disk; its centre falling on the middle thereof, at the middle of the general eclipse. The farther the moon changes from either node, within 17 degrees of it, the shorter is the penumbra's continuance on the earth, because it goes over a less portion of the disk, as is evident by the figure.

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Duration of eclipses in different parts of the earth.

The nearer that the penumbra's centre is to the equator at the middle of the general eclipse, the longer is the duration of the eclipse at all those places where it is central; because, the nearer that any place is to the equator, the greater is the circle it describes by the earth's motion on its axis: and so, the place moving quicker, keeps longer in the penumbra, whose motion is the same way with that of the place, though faster, as has been already mentioned. Thus (see the earth at D and the penumbra at 12) whilst the point *b* in the polar circle *abcd* is carried from *b* to *c* by the earth's diurnal motion, the point *d* on the tropic of Cancer T is carried a much greater length from *d* to D; and therefore, if the penumbra's centre goes one time over *c* and another time over D, the penumbra will be longer in passing over the moving place *d* than it was in passing over the moving place *b*. Consequently, central eclipses about the poles are of the shortest duration; and about the equator, of the longest.

In the middle of summer, the whole frigid zone, included by the polar circle *abcd*, is enlightened; and if it then happens that the penumbra's centre goes over the north pole, the sun will be eclipsed much the same number of digits at *a* as at *c*; but whilst the penumbra moves eastward over *c*, it moves westward over *a*; because, with respect to the penumbra, the motions of *a* and *c* are contrary: for *c* moves the same way with the penumbra towards *d*, but *a* moves the contrary way towards *b*; and therefore the eclipse will be of longer duration at *c* than at *a*. At *a* the eclipse begins on the sun's eastern limb, but at *c* on his western: at all places lying without the polar circles, the sun's eclipses begin on his western limb, or near it, and end on or near his eastern. At those places where the penumbra touches the earth, the eclipse begins with the rising sun, on the top of his western or uppermost edge;

and at those places where the penumbra leaves the earth, the eclipse ends with the setting sun, on the top of his eastern edge, which is then the uppermost, just at its disappearing in the horizon.

If the moon were surrounded by an atmosphere of any considerable density, it would seem to touch the sun a little before the moon made her appulse to his edge, and we should see a little faintness on that edge before it were eclipsed by the moon: but as no such faintness has been observed, it seems plain, that the moon has no such atmosphere as that of the earth. The faint ring of light surrounding the sun in total eclipses, called by Cassini *la chevelure du soleil*, is said to be the atmosphere of the sun; because it has been observed to move equally with the sun, not with the moon. See n^o 43.

Having been so prolix concerning eclipses of the sun, ²⁴⁶ we shall drop that subject at present, and proceed to the eclipses of the doctrine of lunar eclipses; which, being more simple, ^{Lunar ec-}plained, may be explained in less time.

That the moon can never be eclipsed but at the time of her being full, and the reason why she is not eclipsed at every full, has been shewn already. In Plate L. fig. 3, let S be the sun, E the earth, RR the earth's shadow, and B the moon in opposition to the sun: In this situation the earth intercepts the sun's light in its way to the moon; and when the moon touches the earth's shadow at *v*, she begins to be eclipsed on her eastern limb *x*, and continues eclipsed until her western limb *y* leaves the shadow at *w*: at B she is in the middle of the shadow, and consequently in the middle of the eclipse.

The moon, when totally eclipsed, is not invisible if she be above the horizon and the sky be clear; but appears generally of a dusky colour, like tarnished copper, which some have thought to be the moon's native light*. But the true cause of her being visible is the scattered beams of the sun, bent into the earth's shadow by going through the atmosphere; which, being more or less dense near the earth than at considerable heights above it, refracts or bends the sun's rays more inward, the nearer they are passing by the earth's surface, than those rays which go through higher parts of the atmosphere, where it is less dense according to its height, until it be so thin or rare as to lose its refractive power. Let the circle *fgbh*, concentric to the earth, include the atmosphere whose refractive power vanishes at the heights *f* and *i*; so that the rays *Wfw* and *Viv* go on straight without suffering the least refraction: but all those rays which enter the atmosphere between *f* and *k*, and between *i* and *h*, on opposite sides of the earth, are gradually more bent inward as they go thro' a greater portion of the atmosphere, until the rays *Wk* and *Vi* touching the earth at *m* and *n*, are bent so much as to meet at *q*, a little short of the moon; and therefore the dark shadow of the earth is contained in the space *mognp*, where none of the sun's rays can enter: all the rest R R, being mixed by the scattered rays which are refracted as above, is in some measure enlightened by them; and some of those rays falling on the moon, give her the colour of tarnished copper, or of iron almost red hot. So that if the earth had no atmosphere, the moon would be as invisible in total eclipses as she is when new. If the moon were so near the earth as to go into its dark shadow, suppose about *pp*, she would be invisible during her

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Why the moon is visible when eclipsed.

* See n^o 43.

her stay in it; but visible before and after in the fainter shadow RR.

When the moon goes thro' the centre of the earth's shadow, she is directly opposite to the sun: yet the moon has been often seen totally eclipsed in the horizon when the sun was also visible in the opposite part of it: for, the horizontal refraction being almost 34. minutes of a degree, and the diameter of the sun and moon being each at a mean state but 32 minutes, the refraction causes both luminaries to appear above the horizon when they are really below it.

When the moon is full at 12 degrees from either of her nodes, she just touches the earth's shadow, but enters not into it. In Plate LI. fig. 2. let GH be the ecliptic, *ef* the moon's orbit where she is 12 degrees from the node at her full; *cd* her orbit where she is 6 degrees from the node, *ab* her orbit where she is full in the node, A B the earth's shadow, and M the moon. When the moon describes the line *ef*, she just touches the shadow, but does not enter into it; when she describes the line *cd*, she is totally, tho' not centrally, immersed in the shadow; and when she describes the line *ab*, she passes by the node at M in the centre of the shadow, and takes the longest line possible, which is a diameter, through it: and such an eclipse being both total and central is of the longest duration, namely, 3 hours 57 minutes 6 seconds from the beginning to the end, if the moon be at her greatest distance from the earth; and 3 hours 37 minutes 26 seconds, if she be at her least distance. The reason of this difference is, that when the moon is farthest from the earth, she moves slowest; and when nearest to it, quickest.

The moon's diameter, as well as the sun's, is supposed to be divided into 12 equal parts, called *digits*; and so many of these parts as are darkened by the earth's shadow, so many digits is the moon eclipsed. All that the moon is eclipsed above 12 digits, shews how far the shadow of the earth is over the body of the moon, on that edge to which she is nearest at the middle of the eclipse.

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Lunar e-
clipses dis-
tinctly ob-
served.

It is difficult to observe exactly either the beginning or ending of a lunar eclipse, even with a good telescope, because the earth's shadow is so faint and ill defined about the edges, that when the moon is either just touching or leaving it, the obscuration of her limb is scarce sensible; and therefore the nicest observers can hardly be certain to four or five seconds of time. But both the beginning and ending of solar eclipses are visibly instantaneous; for the moment that the edge of the moon's disk touches the sun's, his roundness seems a little broke on that part; and the moment she leaves it, he appears perfectly round again.

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Eclipses
useful in de-
termining
longitudes,
&c.

In astronomy, eclipses of the moon are of great use for ascertaining the periods of her motions; especially such eclipses as are observed to be alike in all her circumstances, and have long intervals of time between them. In geography, the longitudes of places are found by eclipses: but for this purpose eclipses of the moon are more useful than those of the sun, because they are more frequently visible, and the same lunar eclipse is of equal largeness and duration at all places where it is seen. In chronology, both solar and lunar eclipses serve to determine exactly the time of any past event: for there are so many particulars observable in every eclipse, with respect to its quantity, the places

where it is visible (if of the sun), and the time of the day or night, that it is impossible there can be two solar eclipses in the course of many ages which are alike in all circumstances.

From the above explanation of the doctrine of eclipses, it is evident, that the darknets at our Saviour's crucifixion was supernatural. For he suffered on the day on which the passover was eaten by the Jews, on which day it was impossible that the moon's shadow could fall on the earth; for the Jews kept the passover at the time of full moon: nor does the darknets in total eclipses of the sun last above four minutes in any place; whereas the darknets at the crucifixion lasted three hours, Matth. xxviii. 15. and overspread at least all the land of Judea.

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Darknets
at our Savi-
our's cruci-
fixion su-
pernatural.

The theory of eclipses being now, we hope, pretty plainly laid down, the construction of tables for their calculation will be understood from the following considerations.

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Construc-
tion of ta-
bles for cal-
culating e-
clipses.

The motions of the sun and moon are observed to be continually accelerated from the apogee to the perigee, and as gradually retarded from the perigee to the apogee; being slowest of all when the mean anomaly is nothing, and swiftest of all when it is six signs.

When the luminary is in its apogee or perigee, its place is the same as it would be if its motion were equable in all parts of its orbit. The supposed equable motions are called *mean*; the unequable are justly called the *true*.

The mean place of the sun or moon is always forwarder than the true place, whilst the luminary is moving from its apogee to its perigee; and the true place is always forwarder than the mean, whilst the luminary is moving from its perigee to its apogee. In the former case, the anomaly is always less than six signs; and in the latter case, more.

It has been found, by a long series of observations, that the sun goes through the ecliptic, from the vernal equinox to the same equinox again, in 365 days 5 hours 48 minutes 55 seconds; from the first star of Aries to the same star again, in 365 days six hours nine minutes 24 seconds; and from his apogee to the same again, in 365 days six hours 14 minutes 0 seconds.—The first of these is called the *solar year*; the second, the *sidereal year*; and the third, the *anomalistic year*. So that the solar year is 20 minutes 29 seconds shorter than the sidereal; and the sidereal year is 4 minutes 36 seconds shorter than the anomalistic. Hence it appears, that the equinoctial point, or intersection of the ecliptic and equator at the beginning of Aries, goes backward with respect to the fixed stars, and that the sun's apogee goes forward.

It is also observed, that the moon goes through her orbit, from any given fixed star to the same star again, in 27 days 7 hours 43 minutes 4 seconds at a mean rate; from her apogee to her apogee again, in 27 days 13 hours 18 minutes 43 seconds; and from the sun to the sun again, in 29 days 12 hours 44 minutes $3\frac{1}{2}$ seconds. This shews, that the moon's apogee moves forward in the ecliptic, and that at a much quicker rate than the sun's apogee does; since the moon is five hours 55 minutes 39 seconds longer in revolving from her apogee to her apogee again, than from any star to the same star again.

The moon's orbit crosses the ecliptic in two opposite

site points, which are called her *Nodes*: and it is observed, that she revolves sooner from any node to the node again, than from any star to the star again, by 2 hours 38 minutes 27 seconds; which shews, that her nodes move backward, or contrary to the order of signs, in the ecliptic.

The time in which the moon revolves from the sun to the sun again (or from change to change) is called a *Lunation*; which, according to Dr Pound's mean measures, would always consist of 29 days 12 hours 44 minutes 3 seconds 2 thirds 58 fourths, if the motions of the sun and moon were always equable. Hence, 12 mean lunations contain 354 days 8 hours 48 minutes 36 seconds 35 thirds 40 fourths, which is 10 days 21 hours 11 minutes 23 seconds 24 thirds 20 fourths less than the length of a common Julian year, consisting of 365 days 6 hours: and 13 mean lunations contain 383 days 21 hours 32 minutes 39 seconds 38 thirds 38 fourths, which exceeds the length of a common Julian year, by 18 days 15 hours 32 minutes 39 seconds 38 thirds 38 fourths.

The mean time of new moon being found for any given year and month, as suppos'd for March 1700, old stile, if this mean new moon falls later than the 11th day of March, then 12 mean lunations added to the time of this mean new moon will give the time of the mean new moon in March 1701, after having thrown off 365 days. But when the mean new moon happens to be before the 11th of March, we must add 13 mean lunations, in order to have the time of mean new moon in March the year following; always taking care to subtract 365 days in common years, and 366 days in leap-years, from the sum of this addition.

Thus, A. D. 1700, old stile, the time of mean new moon in March was the 8th day, at 16 hours 11 minutes 25 seconds after the noon of that day (viz. at 11 minutes 25 seconds past four in the morning of the 9th day, according to common reckoning). To this we must add 13 mean lunations, or 383 days 21 hours 32 minutes 39 seconds 38 thirds 38 fourths, and the sum will be 392 days 13 hours 44 minutes 4 seconds 38 thirds 38 fourths: from which subtract 365 days, because the year 1701 is a common year, and there will remain 27 days 13 hours 44 minutes 4 seconds 38 thirds 38 fourths for the time of mean new moon in March, A. D. 1701.

Carrying on this addition and subtraction till A. D. 1703, we find the time of mean new moon in March that year to be on the 6th day, at 7 hours 21 minutes 17 seconds 49 thirds 46 fourths past noon; to which add 13 mean lunations, and the sum will be 390 days 4 hours 53 minutes 57 seconds 28 thirds 20 fourths; from which subtract 366 days, because the year 1704 is a leap-year, and there will remain 24 days 4 hours 53 minutes 57 seconds 28 thirds 20 fourths, for the time of mean new moon in March, A. D. 1704.

In this manner was the first of the following tables constructed to seconds, thirds, and fourths; and then wrote out to the nearest seconds.—The reason why we chose to begin the year with March, was to avoid the inconvenience of adding a day to the tabular time in leap-years after February, or subtracting a day therefrom in January and February in those years; to which all tables of this kind are subject, which begin the year with January, in calculating the times of new or full

moons.

The mean anomalies of the sun and moon, and the sun's mean motion from the ascending node of the moon's orbit, are set down in Table III. from 1 to 13 mean lunations.—These numbers, for 13 lunations, being added to the radical anomalies of the sun and moon, and to the sun's mean distance from the ascending node, at the time of mean new moon in March 1700 (Table I.), will give their mean anomalies, and the sun's mean distance from the node, at the time of mean new moon in March 1701; and being added for 12 lunations to those for 1701, give them for the time of mean new moon in March 1702. And so on, as far as you please to continue the table (which is here carried on to the year 1800), always throwing off 12 signs when their sum exceeds 12, and setting down the remainder as the proper quantity.

If the numbers belonging to A. D. 1700 (in Table I.) be subtracted from those belonging to 1800, we shall have their whole differences in 100 complete Julian years; which accordingly we find to be 4 days 8 hours 10 minutes 52 seconds 15 thirds 40 fourths, with respect to the time of mean new moon.—These being added together 60 times (always taking care to throw off a whole lunation when the days exceed 29½), make up 60 centuries, or 6000 years, as in Table VI. which was carried on to seconds, thirds, and fourths; and then wrote out to the nearest seconds. In the same manner were the respective anomalies and the sun's distance from the node found, for these centennial years; and then (for want of room) wrote out only to the nearest minutes, which is sufficient in whole centuries. By means of these two tables, we may find the time of any mean new moon in March, together with the anomalies of the sun and moon, and the sun's distance from the node, at these times, within the limits of 6000 years, either before or after any given year in the 18th century; and the mean time of any new or full moon in any given month after March, by means of the third and fourth tables, within the same limits, as shewn in the precepts for calculation.

Thus it would be a very easy matter to calculate the time of any new or full moon, if the sun and moon moved equally in all parts of their orbits.—But we have already shewn, that their places are never the same as they would be by equable motions, except when they are in apogee or perigee; which is, when their mean anomalies are either nothing, or six signs: and that their mean places are always forwarder than their true places, whilst the anomaly is less than six signs; and their true places are forwarder than the mean, whilst the anomaly is more.

Hence it is evident, that whilst the sun's anomaly is less than six signs, the moon will overtake him, or be opposite to him, sooner than she could if his motion were equable; and later whilst his anomaly is more than six signs.—The greatest difference that can possibly happen between the mean and true time of new or full moon, on account of the inequality of the sun's motion, is 3 hours 48 minutes 28 seconds: and that is, when the sun's anomaly is either 3 signs 1 degree, or 8 signs 29 degrees; sooner in the first case, and later in the last.—In all other signs and degrees of anomaly, the difference is gradually less, and vanishes when the anomaly is either nothing or six signs.

The

The sun is in his apogee on the 30th of June, and in his perigee on the 30th of December, in the present age: so that he is nearer the earth in our winter than in our summer.—The proportional difference of distance, deduced from the difference of the sun's apparent diameter at these times, is as 983 to 1017.

The moon's orbit is dilated in winter, and contracted in summer; therefore the lunations are longer in winter than in summer. The greatest difference is found to be 22 minutes 29 seconds; the lunations increasing gradually in length whilst the sun is moving from his apogee to his perigee, and decreasing in length whilst he is moving from his perigee to his apogee.—On this account, the moon will be later every time in coming to her conjunction with the sun, or being in opposition to him, from December till June, and sooner from June till December, than if her orbit had continued of the same size all the year round.

As both these differences depend on the sun's anomaly, they may be fitly put together into one table, and called *The annual or first equation of the mean to the true syzygy*, (see Table VII.) This equational difference is to be subtracted from the time of the mean syzygy when the sun's anomaly is less than six signs, and added when the anomaly is more.—At the greatest it is 4 hours 10 minutes 57 seconds, viz. 3 hours 48 minutes 28 seconds, on account of the sun's unequal motion, and 22 minutes 29 seconds, on account of the dilatation of the moon's orbit.

This compound equation would be sufficient for reducing the mean time of new or full moon to the true time thereof, if the moon's orbit were of a circular form, and her motion quite equable in it. But the moon's orbit is more elliptical than the sun's, and her motion in it so much the more unequal. The difference is so great, that she is sometimes in conjunction with the sun, or in opposition to him, sooner by 9 hours 47 minutes 54 seconds, than she would be if her motion were equable; and at other times as much later. The former happens when her mean anomaly is 9 signs 4 degrees, and the latter when it is 2 signs 26 degrees. See Table IX.

At different distances of the sun from the moon's apogee, the figure of the moon's orbit becomes different. It is longest of all, or most excentric, when the sun is in the same sign and degree either with the moon's apogee or perigee; shortest of all, or least excentric, when the sun's distance from the moon's apogee is either three signs or nine signs; and at a mean state when the distance is either 1 sign 15 degrees, 4 signs 15 degrees, 7 signs 15 degrees, or 10 signs 15 degrees. When the moon's orbit is at its greatest excentricity, her apogeeal distance from the earth's centre is to her perigeeal distance therefrom, as 1067 is to 933; when least excentric, as 1043 is to 957; and when at the mean state, as 1055 is to 945.

But the sun's distance from the moon's apogee is equal to the quantity of the moon's mean anomaly at the time of new moon, and by the addition of six signs it becomes equal in quantity to the moon's mean anomaly at the time of full moon. Therefore, a table may be constructed so as to answer to all the various inequalities depending on the different excentricities of the moon's orbit, in the syzygies; and called *The second equation of the mean to the true syzygy* (See Ta-

ble IX.): and the moon's anomaly, when equated by Table VIII. may be made the proper argument for taking out this second equation of time; which must be added to the former equated time, when the moon's anomaly is less than six signs, and subtracted when the anomaly is more.

There are several other inequalities in the moon's motion, which sometimes bring on the true syzygy a little sooner, and at other times keep it back a little later, than it would otherwise be: but they are so small, that they may be all omitted except two; the former of which (see Table X.) depends on the difference between the anomalies of the sun and moon in the syzygies, and the latter (see table XI.) depends on the sun's distance from the moon's nodes at these times.—The greatest difference arising from the former is 4 minutes 58 seconds; and from the latter, 1 minute 34 seconds.

The tables here inserted being calculated by Mr Ferguson according to the methods already given, he gives the following directions for their use.

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Directions
for the use
of those
tables.

To calculate the true time of New or full Moon.

PRECEPT I. If the required time be within the limits of the 18th century, write out the mean time of new moon in March, for the proposed year, from Table I. in the old file, or from Table II. in the new; together with the mean anomalies of the sun and moon, and the sun's mean distance from the moon's ascending node. If you want the time of full moon in March, add the half lunation at the foot of Table III. with its anomalies, &c. to the former numbers, if the new moon falls before the 15th of March; but if it falls after, subtract the half lunation, with the anomalies, &c. belonging to it, from the former numbers, and write down the respective sums or remainders.

II. In these additions or subtractions, observe, that 60 seconds make a minute, 60 minutes make a degree, 30 degrees make a sign, and 12 signs make a circle. When you exceed 12 signs in addition, reject 12, and set down the remainder. When the number of signs to be subtracted is greater than the number you subtract from, add 12 signs to the lesser number, and then you will have a remainder to set down. In the tables signs are marked thus ^s, degrees thus ^o, minutes thus ['], and seconds thus ["].

III. When the required new or full moon is in any given month after March, write out as many lunations with their anomalies, and the sun's distance from the node from Table III. as the given month is after March, setting them in order below the numbers taken out for March.

VI. Add all these together, and they will give the mean time of the required new or full moon, with the mean anomalies and sun's mean distance from the ascending node, which are the arguments for finding the proper equations.

V. With the number of days added together, enter Table IV. under the given month; and against that number you have the day of mean new or full moon in the left-hand column, which set before the hours, minutes, and seconds, already found.

But (as it will sometimes happen) if the said number of days falls short of any in the column under the given month, add one lunation and its anomalies, &c. (from Table III.) to the foregoing sums, and then you will

will have a new sum of days wherewith to enter Table IV. under the given month, where you are sure to find it the second time, if the first falls short.

VI. With the signs and degrees of the sun's anomaly, enter Table VII. and therewith take out the annual or first equation for reducing the mean syzygy to the true; taking care to make proportions in the table for the odd minutes and seconds of anomaly, as the table gives the equation only to whole degrees.

Observe, in this and every other case of finding equations, that if the signs are at the head of the table, their degrees are at the left hand, and are reckoned downwards; but if the signs are at the foot of the table, their degrees are at the right hand, and are counted upward; the equation being in the body of the table, under or over the signs, in a collateral line with the degrees. The titles *Add or Subtract* at the head or foot of the tables where the signs are found, shew whether the equation is to be added to the mean time of new or full moon, or to be subtracted from it. In this table, the equation is to be subtracted, if the signs of the sun's anomaly are found at the head of the table; but it is to be added, if the signs are at the foot.

VII. With the signs and degrees of the sun's mean anomaly, enter Table VIII. and take out the equation of the moon's mean anomaly; subtract this equation from her mean anomaly, if the signs of the sun's anomaly be at the head of the table, but add it if they are at the foot; the result will be the moon's equated anomaly, with which enter Table IX. and take out the second equation for reducing the mean to the true time of new or full moon; adding this equation, if the signs of the moon's anomaly are at the head of the

table, but subtracting it if they are at the foot; and the result will give you the mean time of the required new or full moon twice equated, which will be sufficiently near for common almanacs.—But when you want to calculate an eclipse, the following equations must be used: thus,

VIII. Subtract the moon's equated anomaly from the sun's mean anomaly, and with the remainder in signs and degrees, enter Table X. and take out the third equation, applying it to the former equated time, as the titles, *Add or Subtract*, do direct.

IX. With the sun's mean distance from the ascending node enter Table XI. and take out the equation answering to that argument, adding it to, or subtracting it from, the former equated time, as the titles direct, and the result will give the time of new or full moon, agreeing with well regulated clocks or watches, very near the truth. But, to make it agree with the solar, or apparent time, you must apply the equation of natural days, taken from an equation table, as it is leap-year, or the first, second, or third after. This, however, unless in very nice calculations, needs not be regarded, as the difference between true and apparent time is never very considerable.

The method of calculating the time of any new or full moon without the limits of the 18th century, will be shewn further on. And a few examples compared with the precepts, will make the whole work plain.

N. B. The tables begin the day at noon, and reckon forward from thence to the noon following.—Thus, March the 31st, at 22 h. 30 min. 25 sec. of tabular time, is April 1st (in common reckoning) at 30 min. 25 sec. after 10 o'clock in the morning.

E X A M P L E I.

Required the true time of New Moon in April 1764, New Style?

By the Precepts.	New Moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.			
	D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"
March 1764, Add 1 Lunation,	29	12	44	3	8	2	20	0	10	13	35	21	11	4	54	48
Mean New Moon, First Equation,	31	21	39	39	9	1	26	19	11	9	24	21	0	5	35	2
	+	4	10	40	11	10	59	18	+	1	34	57	Sun from Node, and Arg. 4 th equation.			
Time once equated, Second Equation,	32	1	50	19	9	20	27	11	11	10	59	18				
	—	3	24	49	Arg. 3 ^d equation.				Arg. 2 ^d equation.				equation.			
Time twice equated, Third Equation,	31	22	25	30	So the true time is 22 h. 30 min. 25 sec. after the noon of the 31 st March; that is, April 1 st , at 30 min. 25 sec. after ten in the morning. But the apparent time is 26 min. 37 sec. after ten in the morning.											
	+	4	37	7												
Time thrice equated, Fourth Equation,	31	22	30	7												
	+	18	25	25												
True New Moon, Equation of days,	31	22	30	25												
	—	3	48	37												
Apparent time,	31	22	26	37												

Qu. *The true time of Full Moon in May 1762, New Style?*

By the Precepts.

By the Precepts.	New Moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.			
	D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"
March 1762,	24	15	18	24	8	23	48	16	1	23	59	11	10	18	49	14
Add 2 Lunations,	59	1	28	6	1	28	12	39	1	21	38	1	2	1	20	28
New Moon, May,	22	16	46	30	10	22	0	55	3	15	37	12	0	20	9	42
Subt. $\frac{1}{2}$ Lunation,	14	18	22	2	0	14	33	10	6	12	54	30	0	15	20	7
Full Moon, May,	7	22	24	28	10	7	27	45	9	2	42	42	0	4	49	35
First Equation,	+	3	16	36	9	3	57	18	+	1	14	36	Sun from Node, and Arg. fourth equation.			
Time once equated, Second Equation,	8	1	41	4	1	3	30	27	9	3	57	18				
	—	9	47	53	Arg. 3 ^d equation.				Arg. 2 ^d equation.							
Time twice equated, Third Equation,	7	15	53	11	Ans. May 7 th at 15 h. 50 min. 50 sec. past noon, viz. May 8 th at 3 h. 50 min. 50 sec. in the morning.											
	—	2	36													
Time thrice equated, Fourth Equation,	7	15	50	35												
			+	15												
The Full Moon,	7	15	50	50												

253 To calculate the time of New and Full Moon in a given year and month of any particular century, between the Christian era and the 18th century.

PRECEPT I. Find a year of the same number in the 18th century with that of the year in the century proposed, and take out the mean time of new moon in March, old stile, for that year, with the mean anomalies and sun's mean distance from the node at that time, as already taught.II. Take as many complete centuries of years from Table VI. as, when subtracted from the above said year in the 18th century, will answer to the given year; and take out the first mean new moon and its anomalies, &c.belonging to the said centuries, and set them below those taken out for March in the 18th century.III. Subtract the numbers belonging to these centuries, from those of the 18th century, and the remainders will be the mean time and anomalies, &c. of new moon, in March, in the given year of the century proposed.—Then, work in all respects for the true time of new or full moon, as shewn in the above precepts and examples.IV. If the days annexed to these centuries exceed the number of days from the beginning of March taken out in the 18th century, add a lunation and its anomalies, &c. from Table III. to the time and anomalies of new moon in March, and then proceed in all respects as above.—This circumstance happens in Example V.

E X A M P L E III.

Required the true time of Full Moon in April, Old Stile, A. D. 30.

From 1730 subtract 1700 (or 17 centuries) and there remains 30.

By the Precepts.

By the Precepts.	New Moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.							
	D.	H.	M.	S.	s.	o	'	"	s	o	'	"	s	o	'	"				
March 1730,	7	12	34	16	8	18	4	31	9	0	32	17	1	23	17	16				
Add $\frac{1}{2}$ Lunation,	14	18	22	2	0	14	33	10	6	12	54	30	0	15	20	7				
Full Moon,	22	6	56	18	9	2	37	41	3	13	26	47	2	8	37	23				
1700 years subtr.	14	17	36	42	11	28	46	0	10	29	36	0	4	29	23	0				
Full \mathcal{D} March A. D. 30.	7	13	19	36	9	3	51	41	4	13	50	47	9	9	14	23				
Add 1 Lunation,	29	12	44	3	0	29	6	19	0	25	49	0	1	0	40	14				
Full Moon, April,	6	2	3	39	10	2	58	0	5	9	39	47	10	9	54	37				
First Equation,	+	3	28	4	5	10	58	40	+	1	18	53	Sun from Node, and Arg. fourth equation.							
Time once equated, Second Equation,	6	5	31	43	4	21	59	20	5	10	58	40								
	+	2	57	48	Arg. 3 ^d equation.				Arg. 2 ^d equation.				equation.							
Time twice equated, Third Equation,	6	8	29	31	Hence it appears, that the true time of Full Moon in April, A. D. 30, old file, was on the 6 th day, at 25 m. 4 l. past eight in the evening.															
	—	2	54																	
Time thrice equated, Fourth Equation,	6	8	26	37																
	—	1	33																	
True Full Moon, April,	6	8	25	4																

Hence it appears, that the true time of Full Moon in April, A. D. 30, old stile, was on the 6th day, at 25 m. 4 f. past eight in the evening.

254 To calculate the true time of New or Full Moon in any given year and month before the Christian era.

PRECEPT I. Find a year in the 18th century, which being added to the given number of years before Christ diminished by one, shall make a number of complete centuries.

II. Find this number of centuries in Table VI. and

subtract the time and anomalies belonging to it from those of the mean new moon in March, the above-found year of the 18th century; and the remainder will denote the time and anomalies, &c. of mean new moon in March, the given year before Christ.—Then, for the true time thereof in any month of that year, proceed as above taught.

E X A M P L E IV.

Required the true time of New Moon in May, Old Stile, the year before Christ 585?

The years 584 added to 1716, make 2300, or 23 centuries.

By the Precepts.

March 1716,
2300 years subtra&t.

March before Christ 585,
Add 3 Lunations,

May before Christ 585,
First Equation,

Time once equated,
Second Equation,

Time twice equated,
Third Equation,

Time thrice equated,
Fourth Equation,

True new moon,

New moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.							
D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"				
11	17	33	29	8	22	50	39	4	4	14	2	4	27	17	5				
11	5	57	53	11	19	47	0	1	5	59	0	7	25	27	0				
0	11	35	36	9	3	3	39	2	28	15	2	9	1	50	5				
88	14	12	9	2	27	18	58	2	17	27	1	3	2	0	42				
28	1	47	45	0	0	22	37	5	15	42	3	0	3	50	47				
—	1	37		5	15	41	17	—	46			Sun from Node, and Arg. fourth equation.							
28	1	46	8	6	14	41	20	5	15	41	17								
+	2	15	1	Arg. 3 ^d equation.				Arg. 2 ^d equation.											
28	4	1	9																
+	1	1	9																
28	4	2	18																
+			12																
28	4	2	30																

So the true time was May 28th, at 2 minutes 30 seconds past four in the afternoon.

So the true time was May 28th, at 2 minutes 30 seconds past four in the afternoon.

255 These Tables are calculated for the meridian of London; but they will serve for any other place, by subtracting four minutes from the tabular time, for every

degree that the meridian of the given place is westward of London, or adding four minutes for every degree that the meridian of the given place is eastward: as in

E X A M P L E V.

Required the true time of Full Moon at Alexandria in Egypt in September, Old Stile, the year before Christ 201?

The years 200 added to 1800, make 2000, or 20 centuries.

By the Precepts.

March 1800,
Add 1 lunation,

From the sum,
Subtract 2000 years,

N. M. bef. Chr. 201,
Add { 6 lunations,
half lunations,

Full Moon, September,
First equation,

Time once equated,
Second equation,

Time twice equated,
Third equation,

Time thrice equated,
Fourth equation,

True time at London,
Add for Alexandria,

True time there,

New Moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.							
D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"				
13	0	22	17	8	23	19	55	10	7	52	36	11	3	58	24				
29	12	44	3	0	29	6	19	0	25	49	0	1	0	40	14				
42	13	6	20	9	22	26	14	11	3	41	36	0	4	38	38				
27	18	9	19	0	8	50	0	0	15	42	0	6	27	45	0				
14	18	57	1	9	13	36	14	10	17	59	36	5	6	53	38				
177	4	24	18	5	24	37	56	5	4	54	3	6	4	1	24				
14	18	22	2	0	14	33	10	6	12	54	30	0	15	20	7				
22	17	43	21	3	22	47	20	10	5	48	9	11	26	15	9				
—	3	52	6	10	4	19	53	—	1	28	14	Sun from Node, and Argument fourth equation.							
22	13	51	15	5	18	27	25	10	4	19	55	Arg. 2 ^d equation.							
—	8	25	4	Arg. 3 ^d equation.															
22	5	26	11																
—	58																		
22	5	25	12																
—	12																		
22	5	25	1																
2	1	27																	
22	7	26	28																

Thus it appears, that the true time of Full Moon at Alexandria, in September, old stile, the year before Christ 201, was the 22^d day, at 26 minutes 28 seconds after seven in the evening.

5 M 2

EXAMPLE

Thus it appears, that the true time of Full Moon at Alexandria, in September, old stile, the year before Christ 201, was the 22^d day, at 26 minutes 28 seconds after seven in the evening.

EXAMPLE VI.

Required the true time of Full Moon at Babylon in October, Old Style, the 4008 year before the first year of Christ, or 4007 before the year of his birth?

The years 4007 added to 1793, make 5800, or 58 centuries.

By the Precepts.

By the Precepts.	New Moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.				
	D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"	
March 1793,	30	9	13	55	9	10	16	11	8	7	37	58	7	6	18	26	
Subtract 5800 years,	15	12	38	7	10	21	35	0	6	24	43	0	9	13	1	0	
N. M. bef. Chr. 4007,	14	20	35	48	10	18	41	11	1	12	54	58	9	23	17	26	
Add { 7 lunations,	206	17	8	21	6	23	44	15	6	0	43	3	7	4	41	38	
half lunations,	14	18	22	2	0	14	33	10	6	12	54	30	0	15	20	7	
Full Moon, October,	22	8	6	11	5	26	58	36	1	26	32	31	5	13	19	11	
First Equation,	—	13	26		1	26	27	26	—	5	5		Sun from Node,				
Time once equated,	22	7	52	45	4	0	31	10	1	20	27	26	and Argument of				
Second Equation,	+	8	29	21	Arg. 3 ^d equation.				Arg. 2 ^d equation.				fourth equation.				
Time twice equated,	22	16	22	6	<p>So that, on the meridian of London, the true time was October 23^d, at 17 minutes 5 seconds past four in the morning; but at Babylon, the true time was October 23^d, at 42 minutes 46 seconds past six in the morning.—This is supposed by some to have been the year of the creation.</p>												
Third Equation,	—	4	10														
Time thrice equated,	22	16	17	56													
Fourth equation,	—	51															
Full Moon at London,	22	16	17	5													
Add for Babylon,			2	25													41
True time there,	22	18	42	46													

So that, on the meridian of London, the true time was October 23^d, at 17 minutes 5 seconds past four in the morning; but at Babylon, the true time was October 23^d, at 42 minutes 46 seconds past six in the morning.—This is supposed by some to have been the year of the creation.

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To calculate the true time of new or full moon in any given year and month after the 18th century.

PRECEPT I. Find a year of the same number in the 18th century with that of the year proposed, and take out the mean time and anomalies, &c. of new moon in March, old style, for that year, in Table I.

II. Take so many years from Table VI. as when added to the abovementioned year in the 18th century

will answer to the given year in which the new or full moon is required; and take out the first new moon, with its anomalies for these complete centuries.

III. Add all these together, and then work in all respects as above shewn, only remember to subtract a lunation and its anomalies, when the above said addition carries the new moon beyond the 31st of March; as in the following example.

EXAMPLE VII.

Required the true time of New Moon in July, Old Style, A. D. 2180?

Four centuries (or 400 years) added to A. D. 1780, make 2180.

By the Precepts.

By the Precepts.	New Moon.				Sun's Anomaly.				Moon's Anomaly.				Sun from Node.							
	D.	H.	M.	S.	s	o	'	"	s	o	'	"	s	o	'	"				
March 1780,	23	23	1	44	9	4	18	13	1	21	7	47	10	18	21	1				
Add 400 years,	17	8	43	29	0	13	24	0	10	1	28	0	6	17	49	0				
From the sum	41	7	45	13	9	17	42	13	11	22	35	47	6	10	1					
Subtract 1 lunation,	29	12	44	3	0	29	6	19	0	25	49	0	0	40	14					
New Moon March 2180,	11	19	1	10	8	18	35	54	10	26	46	47	4	5	29	47				
Add 4 lunations,	118	2	56	12	3	26	25	17	3	13	16	2	4	2	40	56				
New Moon July 2180,	7	21	57	22	0	15	1	11	2	10	2	49	8	8	10	43				
First equation,	—	1	3	39	3	9	38	37	—	24	12		Sun from Node and argument of fourth equation.							
Time once equated,	7	20	53	43	10	5	22	34	2	9	38	37								
Second equation,	+	9	24	8	Arg. 3 ^d equation.				Arg. 2 ^d equation.											
Time twice equated,	8	6	17	51	True time, July 8 th , at 22 minutes 55 seconds past six in the evening.															
Third equation,	+	3	56																	
Time thrice equated,	8	6	21	47																
Fourth equation,	+	1	8																	
True time. July,	8	6	22	55																

True time, July 8th, at 22 minutes 55 seconds past six in the evening.

In keeping by the old stile, we are always sure to be right, by adding or subtracting whole hundreds of years to or from any given year in the 18th century. But in the new stile we may be very apt to make mistakes, on account of the leap-year's not coming in regularly every fourth year: and therefore, when we go without the limits of the 18th century, we had best keep to the old stile, and at the end of the calculation reduce the time to the new. Thus, in the 22^d century, there will be fourteen days difference between the stiles; and therefore, the true time of new moon in this last example being reduced to the new stile, will be the 22^d of July, at 22 minutes 55 seconds past six in the evening.

257 To calculate the true place of the Sun for any given moment of time.

PRECEPT I. In Table XII. find the next lesser year in number to that in which the sun's place is sought, and write out his mean longitude and anomaly answering thereto: to which add his mean motion and

E X A M P L E I.

Required the Sun's true place, March 20th Old Stile, 1764, at 22 hours 30 minutes 25 seconds past noon? In common reckoning, March 21st, at 10 hours 30 minutes 25 seconds in the afternoon.

To the radical year after Christ — — — 1701
Add complete years — — — — — 60
March 3
Bissextile Days — — — 20
Hours — — — 22
Minutes — — — 30
Seconds — — — 25

Sun's mean place at the given time — — — —
Equation of the Sun's centre, add — — — —
Sun's true place at the same time — — — —

Sun's Longitude.					Sun's Anomaly.				
s	o	'	"		s	o	'	"	
9	20	43	50		6	13	1	0	
0	0	27	12		11	29	26	0	
11	29	17	0		11	29	14	0	
1	28	9	31		1	28	9	0	
20	41	55			20	41	55		
		54	13				54	13	
		1	14				1	14	
			1					1	
0	10	14	36		9	1	27	23	
		1	55	36	Mean Anomaly.				
0	12	10	12	or 0	12	10	12		

E X A M P L E II.

Required the Sun's true place, October 23^d, Old Stile, at 16 hours 57 minutes past noon, in the 4008th year before the year of Christ 1; which was the 4007th before the year of his birth, and the year of the Julian period 706.
By the Precepts.

From the radical numbers after Christ — — — 1
Subtract those for 5000 complete years — — — —
Remains for a new radix
To which add, to bring it to the given time. { complete years — — — 900
12
October
Days 23
Hours 16
Minutes 57

Sun's mean place at the given time — — — —
Equation of the sun's centre subtract — — — —
Sun's true place at the same time — — — —

Sun's Longitude.					Sun's Anomaly.				
s	o	'	"		s	o	'	"	
9	7	53	10		6	28	48	0	
1	7	46	40		10	13	25	0	
8	0	6	30		8	15	23	0	
0	6	48	0		11	21	37	0	
0	0	36	16		11	29	15	0	
0	0	5	26		11	29	53	0	
8	29	4	54		8	29	4	0	
22	40	12			22	40	12		
		39	26				39	26	
			20					20	
6	0	3	4		5	28	33	58	
		3	4		Sun's Anomaly.				
6	0	0	0	or 0	6	0	0	0	

So that in the meridian of London, the sun was then just entering the sign ♎ Libra, and consequently was upon the point of the autumnal equinox.

If to the above time of the autumnal equinox at London, we add 2 hours, 25 minutes 41 seconds for the longitude of Babylon, we shall have for the time of the same equinox, at that place, October 23^d, at 19 hours 22 minutes 41 seconds; which, in the common way of reckonings, is October 24th, at 22 minutes 41 seconds past seven in the morning.

And it appears by Example VI. that in the same year, the true time of full moon at Babylon was October 23^d, at 42 minutes 46 seconds after six in the morning; so that the autumnal equinox was on the day next after the day of full moon.—The dominical letter for that year was G, and consequently the 24th of October was on a Wednesday.

grees, shews that the sun must then be eclipsed.

And now we shall shew how to project this, or any other eclipse, either of the sun or moon.

To project an Eclipse of the Sun.

In order to this, we must find the ten following elements, by means of the tables.

1. The true time of conjunction of the sun and moon; and at that time.
2. The semidiameter of the earth's disk, as seen from the moon, which is equal to the moon's horizontal parallax.
3. The sun's distance from the solstitial colure to which he is then nearest.
4. The sun's declination.
5. The angle of the moon's visible path with the ecliptic.
6. The moon's latitude.
7. The moon's true horary motion from the sun.
8. The sun's semidiameter.
9. The moon's.
10. The semidiameter of the penumbra.

We shall now proceed to find these elements for the sun's eclipse in April 1764.

To find the true time of new moon. This, by Example I. p. 829, is found to be on the first day of the said month, at 30 minutes 25 seconds after ten in the morning.

2. To find the moon's horizontal parallax, or semidiameter of the earth's disk, as seen from the moon. Enter Table XVII. with the signs and degrees of the moon's anomaly (making proportions, because the anomaly is in the table only to every 6th degree), and thereby take out the moon's horizontal parallax; which for the above time, answering to the anomaly 118 9° 24' 21", is 54' 53".

3. To find the sun's distance from the nearest solstice, viz. the beginning of Cancer, which is 38 or 90° from the beginning of Aries. It appears by Example I. on p. 833, (where the sun's place is calculated to the above time of new moon) that the sun's longitude from the beginning of Aries is then 08 12° 10' 12": that is, the sun's place at that time is ♈ Aries, 12° 10' 12".

Therefore from	-	-	-	-	-
	3	0	0	0	0
Subtract the sun's longitude or place	0	12	10	12	12

Remains the sun's distance from the solstice ♋ } = 2 17 49 48
Or 77° 49' 48"; each sign containing 30 degrees.

4. To find the sun's declination. Enter Table XIV. with the signs and degrees of the sun's true place, viz. 08 12°, and making proportions for the 10' 12", take out the sun's declination answering to his true place, and it will be found to be 4° 49' north.

5. To find the moon's latitude. This depends on her distance from her ascending node, which is the same as the sun's distance from it at the time of new moon; and is thereby found in Table XVI.

But we have already found, that the sun's equated distance from the ascending node, at the time of new moon in April 1764, is 08 7° 42' 14". See above.

Therefore, enter Table XVI. with 0 signs at the top, and 7 and 8 degrees at the left hand, and take out 36' and 39", the latitude for 7°; and 41' 51", the latitude for 8°: and by making proportions between these latitudes for the 42' 14", by which the moon's distance from the node exceeds 7 degrees; her true latitude will be found to be 40' 18" north ascending.

6. To find the moon's true horary motion from the sun. With

To find the sun's distance from the moon's ascending node, at the time of any given new or full moon; and consequently, to know whether there is an eclipse at that time, or not.

The sun's distance from the moon's ascending node is the argument for finding the moon's fourth equation in the fyzygies, and therefore it is taken into all the foregoing examples in finding the times thereof. Thus, at the time of mean new moon in April 1764, the sun's mean distance from the ascending node, is 08 5° 35' 2". See Example I. p. 829.

The descending node is opposite to the ascending one, and they are just six signs distant from each other.

When the sun is within 17 degrees of either of the nodes at the time of new moon, he will be eclipsed at that time; and when he is within 12 degrees of either of the nodes at the time of full moon, the moon will be then eclipsed. Thus we find, that there will be an eclipse of the sun at the time of new moon in April 1764.

But the true time of that new moon comes out by the equations to be 50 minutes 46 seconds later than the mean time thereof, by comparing these times in the above example; and therefore, we must add the sun's motion from the node during that interval, to the above mean distance 08 5° 35' 2", which motion is found in Table XII. for 50 minutes 46 seconds, to be 2' 12". And to this we must apply the equation of the sun's mean distance from the node, in Table XV. found by the sun's anomaly, which, at the mean time of new moon in Example I. is 08 12° 26' 19"; and then we shall have the sun's true distance from the node, at the true time of new moon, as follows:

	Sun from Node.
	s o ' "
At the mean time of new moon in ?	
April 1764.	0 5 35 2
Sun's motion from the } 50 minutes	2 10
node for } 46 seconds	2
Sun's mean distance from node at true new moon	0 5 37 14
Equation of mean distance from node, add	2 5 0
Sun's true distance from the ascending node	0 7 42 14
Which being far within the above limit of 17 de-	

With the moon's anomaly, viz. $11^{\circ} 9' 24'' 11''$, enter Table XVII. and take out the moon's horary motion; which, by making proportions in that table, will be found to be $30' 22''$. Then, with the sun's anomaly, $9^{\circ} 1^{\circ} 16' 19''$, take out his horary motion $2' 28''$ from the same table: and subtracting the latter from the former, there will remain $27' 54''$ for the moon's true horary motion from the sun.

7. To find the angle of the moon's visible path with the ecliptic. This, in the projection of eclipses, may be always rated at $5^{\circ} 35'$, without any sensible error.

8, 9. To find the semidiameters of the sun and moon. These are found in the same table, and by the same arguments, as their horary motions. In the present case, the sun's anomaly gives his semidiameter $16' 6''$, and the moon's anomaly gives her semidiameter $14' 57''$.

10. To find the semidiameter of the penumbra. Add the moon's semidiameter to the sun's, and their sum will be the semidiameter of the penumbra, viz. $31' 3''$.

Now collect these elements, that they may be found the more readily when they are wanted in the construction of this eclipse.

1. True time of new moon in April, 1764	1	10	30	25
	0	1	"	
2. Semidiameter of the earth's disk	0	54	53	
3. Sun's distance from the nearest solst	77	49	48	
4. Sun's declination, north	4	49	0	
5. Moon's latitude, north ascending	0	40	18	
6. Moon's horary motion from the sun	0	27	54	
7. Angle of the moon's visible path with the ecliptic	5	35	0	
8. Sun's semidiameter	16	6		
9. Moon's semidiameter	14	57		
10. Semidiameter of the penumbra	31	3		

To project an eclipse of the sun geometrically.

Make a scale of any convenient length, as AC, and divide it into as many equal parts as the earth's semidisk contains minutes of a degree; which, at the time of the eclipse in April 1764, is $54' 53''$. Then, with the whole length of the scale as a radius, describe the semicircle AMB upon the centre C; which semicircle shall represent the northern half of the earth's enlightened disk, as seen from the sun.

Upon the centre C raise the straight line CH, perpendicular to the diameter ACB; to ACB shall be a part of the ecliptic, and CH its axis.

Being provided with a good sector, open it to the radius CA in the line of chords; and taking from thence the chord of $23\frac{1}{2}$ degrees in your compasses, set it off both ways from H, to g and to b, in the periphery of the semidisk; and draw the straight line gVh, in which the north pole of the disk will always be found.

When the sun is in Aries, Taurus, Gemini, Cancer, Leo, and Virgo, the north pole of the earth is enlightened by the sun: but whilst the sun is in the other six signs, the fourth pole is enlightened, and the north pole is in the dark.

And when the sun is in Capricorn, Aquarius, Pifces, Aries, Taurus, and Gemini, the northern half of the earth's axis C XII P lies to the right hand of the axis of the ecliptic, as seen from the sun; and to the

left hand, whilst the sun is in the other six signs.

Open the sector till the radius (or distance of the two 90's) of the fines be equal to the length of Vh, and take the sine of the sun's distance from the solstice ($77^{\circ} 49' 48''$) as nearly as you can guess, in your compasses, from the line of fines, and set off that distance from V to P in the line gVh, because the earth's axis lies to the right hand of the axis of the ecliptic in this case, the sun being in Aries; and draw the straight line C XII P for the earth's axis, of which P is the north pole. If the earth's axis had lain to the left hand from the axis of the ecliptic, the distance VP would have been set off from V towards g.

To draw the parallel of latitude of any given place, as suppos'd London, or the path of that place on the earth's enlightened disk as seen from the sun, from sunrise till sun-set, take the following method.

Subtract the latitude of London, $51^{\circ} \frac{1}{2}'$ from 90° , and the remainder $38^{\circ} \frac{1}{2}'$ will be the co-latitude, which take in your compasses from the line of chords, making CA or CB the radius, and set it from h (where the earth's axis meets the periphery of the disk) to VI and VI, and draw the occult or dotted line VI K VI. Then, from the points where this line meets the earth's disk, set off the chord of the sun's declination $4^{\circ} 49'$ to D and F, and to E and G, and connect these points by the two occult lines F XII G and DLE.

Bisect LK XII in K, and through the point K draw the black line VI K VI. Then making CB the radius of a line of fines on the sector, take the co-latitude of London $38^{\circ} \frac{1}{2}'$ from the fines in your compasses, and set it both ways from K, to VI and VI.—These hours will be just in the edge of the disk at the equinoxes, but at no other time in the whole year.

With the extent K VI taken into your compasses, set one foot in K (in the black line below the occult one) as a centre, and with the other foot describe the semicircle VI 7 8 9 10, &c. and divide it into 12 equal parts. Then, from these points of division, draw the occult lines 7p, 8o, 9n, &c. parallel to the earth's axis C XII P.

With the small extent K XII as a radius, describe the quadrantal arc XII; and divide it into six equal parts, as XII a, ab, bc, cd, de, and ef; and through the division-points a, b, c, d, e draw the occult lines VII e V, VIII d IV, IX c III, X b II, and XI a I, all parallel to VI K VI, and meeting the former occult lines 7p, 8o, &c. in the points VII VIII IX X XI, V IV III II and I: which points shall mark the several situations of London on the earth's disk, at these hours respectively, as seen from the sun; and the elliptic curve VI VII VIII, &c. being drawn through these points, shall represent the parallel of latitude, or path of London on the disk, as seen from the sun, from its rising to its setting.

N. B. If the sun's declination had been south, the diurnal path of London would have been on the upper side of the line VI K VI, and would have touched the line DLE in L. It is requisite to divide the horary spaces into quarters (as some are in the figure), and, if possible, into minutes also.

Make CB the radius of a line of chords on the sector, and taking therefrom the chord of $5^{\circ} 35'$, the angle of the moon's visible path with the ecliptic, set it off from H to M on the left hand of CH, the axis

of the ecliptic, because the moon's latitude is north ascending. Then draw CM for the axis of the moon's orbit, and bisect the angle MCH by the right line Cz. If the moon's latitude had been north descending, the axis of her orbit would have been on the right hand from the axis of the ecliptic.—N. B. The axis of the moon's orbit lies the same way when her latitude is south ascending, as when it is north ascending; and the same way when south descending, as when north descending.

Take the moon's latitude $40^{\circ} 18'$ from the scale CA in your compasses, and set it from i to x in the bisecting line Cz, making ix parallel to Cy; and thro' x , at right angles to the axis of the moon's orbit CM, draw the straight line N wxyS for the path of the penumbra's centre over the earth's disk.—The point w , in the axis of the moon's orbit, is that where the penumbra's centre approaches nearest to the centre of the earth's disk, and consequently is the middle of the general eclipse: the point x is that where the conjunction of the sun and moon falls, according to equal time by the tables; and the point y is the ecliptical conjunction of the sun and moon.

Take the moon's true horary motion from the sun, $27' 54''$, in your compasses, from the scale CA (every division of which is a minute of a degree), and with that extent make marks along the path of the penumbra's centre; and divide each space from mark to mark into sixty equal parts or horary minutes, by dots; and set the hours to every 60th minute in such a manner, that the dot signifying the instant of new moon by the tables, may fall into the point x , half way between the axis of the moon's orbit and the axis of the ecliptic; and then, the rest of the dots will shew the points of the earth's disk, where the penumbra's centre is at the instants denoted by them, in its transit over the earth.

Apply one side of a square to the line of the penumbra's path, and move the square backwards and forwards until the other side of it cuts the same hour and minute (as at m and m) both in the path of London, and in the path of the penumbra's centre; and the particular minute or instant which the square cuts at the same time in both paths, shall be the instant of the visible conjunction of the sun and moon, or greatest obscuration of the sun, at the place for which the construction is made, namely London, in the present example; and this instant is at $47\frac{1}{2}$ minutes past ten o'clock in the morning; which is 17 minutes five seconds later than the tabular time of true conjunction.

Take the sun's semidiameter, $16' 6''$, in your compasses, from the scale CA, and setting one foot in the path of London, at m , namely at $47\frac{1}{2}$ minutes past ten, with the other foot describe the circle UY, which shall represent the sun's disk as seen from London at the greatest obscuration.—Then take the moon's semidiameter, $14' 57''$, in your compasses from the same scale; and setting one foot in the path of the penumbra's centre at m , in the $47\frac{1}{2}$ minute after ten, with the other foot describe the circle TY for the moon's disk, as seen from London, at the time when the eclipse is at the greatest, and the portion of the sun's disk which is hid or cut off by the moon's, will shew the quantity of the eclipse at that time; which quantity may be

measured on a line equal to the sun's diameter, and divided into 12 equal parts for digits.

Lastly, take the semidiameter of the penumbra, $31' 3''$, from the scale CA in your compasses; and setting one foot in the line of the penumbra's central path, on the left hand from the axis of the ecliptic, direct the other foot toward the path of London; and carry that extent backwards and forwards, till both the points of the compasses fall into the same instants in both the paths: and these instants will denote the time when the eclipse begins at London.—Then, do the like on the right hand of the axis of the ecliptic; and where the points of the compasses fall into the same instants in both the paths, they will shew at what time the eclipse ends at London.

These trials give 20 minutes after nine in the morning for the beginning of the eclipse at London, at the points N and O; $47\frac{1}{2}$ minutes after ten, at the points m and m , for the time of greatest obscuration; and 18 minutes after twelve, at R and S, for the time when the eclipse ends; according to mean or equal time.

From these times we must subtract the equation of natural days, viz. three minutes 48 seconds, in leap-year April 1, and we shall have the apparent times; namely, nine hours 16 minutes 12 seconds for the beginning of the eclipse, ten hours 43 minutes 42 seconds for the time of greatest obscuration, and 12 hours 14 minutes 12 seconds for the time when the eclipse ends.—But the best way is to apply this equation to the true equal time of new moon, before the projection be begun; as is done in example I. For the motion or position of places on the earth's disk answer to apparent or solar time.

In this construction it is supposed, that the angle under which the moon's disk is seen, during the whole time of the eclipse, continues invariably the same; and that the moon's motion is uniform and rectilinear during that time. But these suppositions do not exactly agree with the truth; and therefore, supposing the elements given by the tables to be accurate, yet the times and phases of the eclipse, deduced from its construction, will not answer exactly to what passeth in the heavens; but may be at least two or three minutes wrong, though done with the greatest care. Moreover, the paths of all places of considerable latitudes, are nearer the centre of the earth's disk, as seen from the sun, than those constructions make them: because the disk is projected as if the earth were a perfect sphere although it is known to be a spheroid. Consequently, the moon's shadow will go farther northward in all places of northern latitude, and farther southward in all places of southern latitude, than it is shewn to do in these projections.—According to Meyer's Tables, this eclipse was about a quarter of an hour sooner than either these tables, or Mr Flamsteed's, or Dr Halley's make it; and was not annular at London. But M. De la Caille's make it almost central.

The projection of lunar eclipses.

When the moon is within 12 degrees of either of her nodes at the time when she is full, she will be eclipsed, otherwise not.

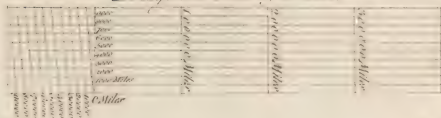
We find by example second, page 830, that at the time of mean full moon in May 1762, the sun's distance from the ascending node was only $4^{\circ} 49' 35''$; and

Fig. 1.

THE SUN

with the GREAT SPOT in 1769.

Diagonal Scale of Miles.



Jupiter
8 his Satellites.



Distance of the fourth Satellite from the third.

Moon
Mercury
Venus
Mars
Earth

Saturn
8 his Satellites.



Fifth
Satellite shows
the distance of
the fourth.

Fig. 2.

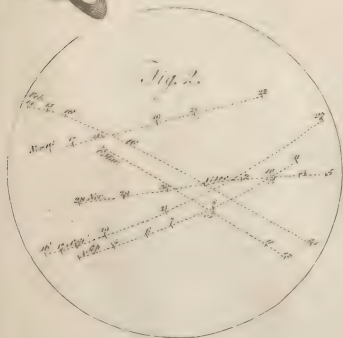
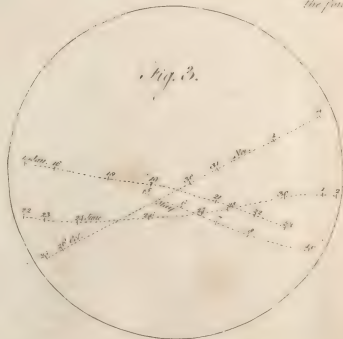


Fig. 3.



W. Hill, Sculp.



Fig. 2.

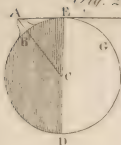


Fig. 3

Dep. 2. 1773. 4. 8. 5. 5.

2. At
his.

THE MOON.



• 111.

Chrysomelidae - Hydrophilidae

Fig. 3.

1840

12-10-12 4-4

Fig. 1.

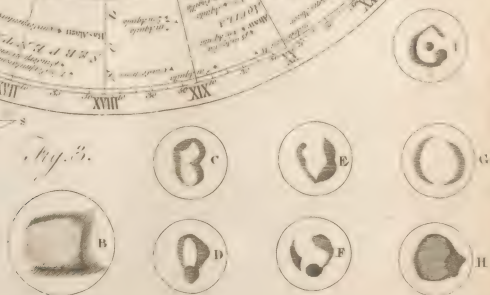
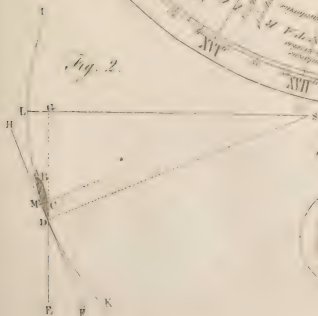
1011 13. 1773

W. H. S. S. S.



THE PRINCIPLE FIXED STARS OF THE NORTH HEMISPHERE.

Delimited on the Plan of the Equator.

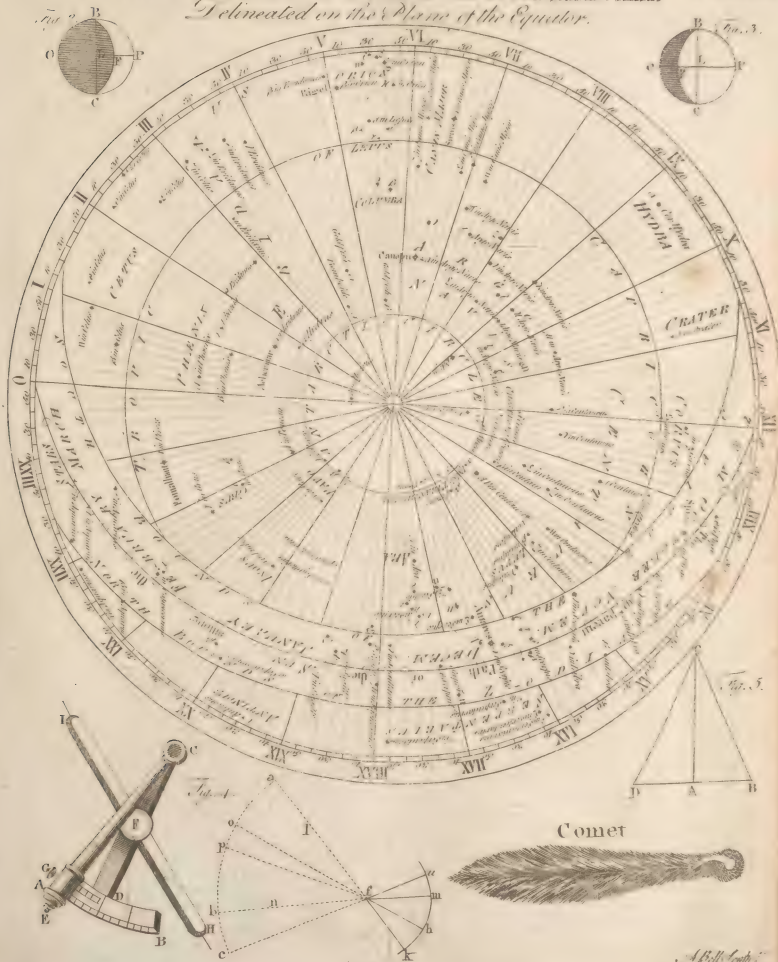
*A. Well, 'scalp.'*



THE PRINCIPLE FIXED STARS OF THE SOUTH HEMISPHERE

5. Plate XLII.

Declined on the Plane of the Equator.





6th Plate XLII.

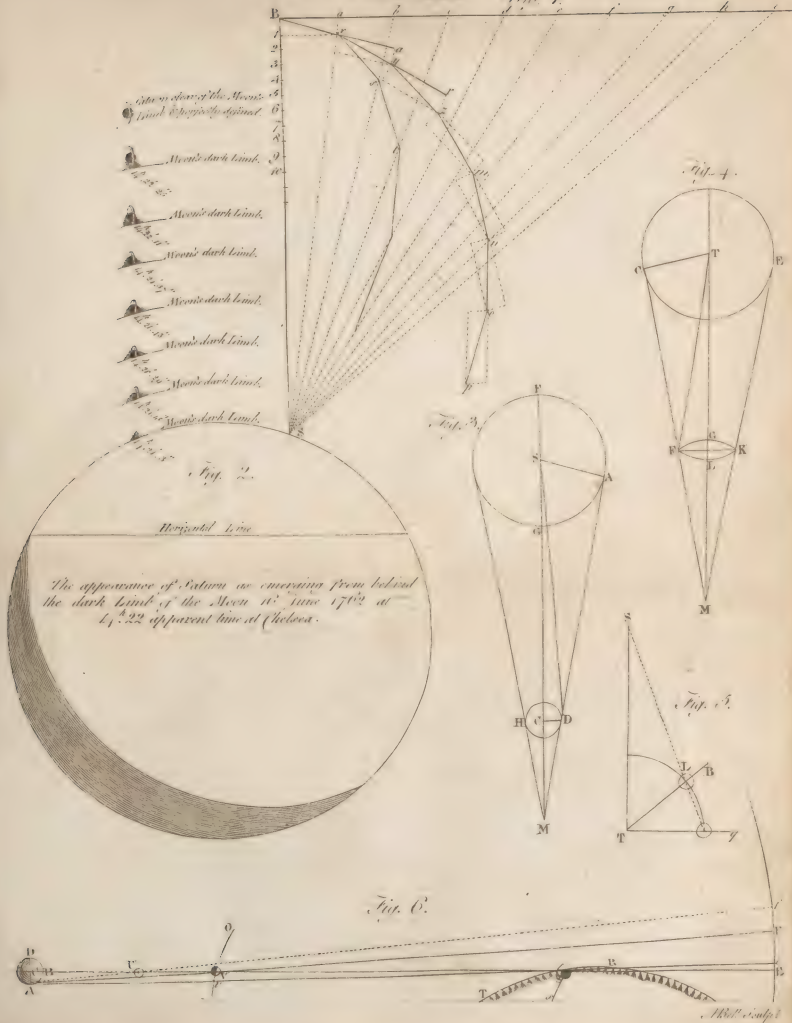
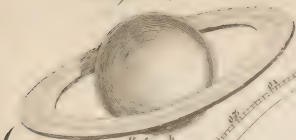




Fig. 5.



Saturnus

☉ Mars

☿ Earth & Moon

☿ Venus

☿ Mercury

Jupiter

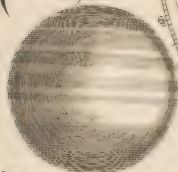
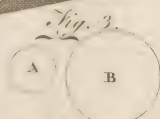
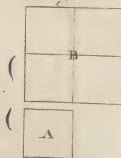


Fig. 2.



Fig. 3.



Vries	Taurus	Gemini
♈	♉	♊
Cancer	Leo	Virgo
♊	♌	♍
Libra	Sagittarius	♐
♎	♑	♒
Capricornus	Aquarius	Pisces
♏	♒	♓

Fig. 1.

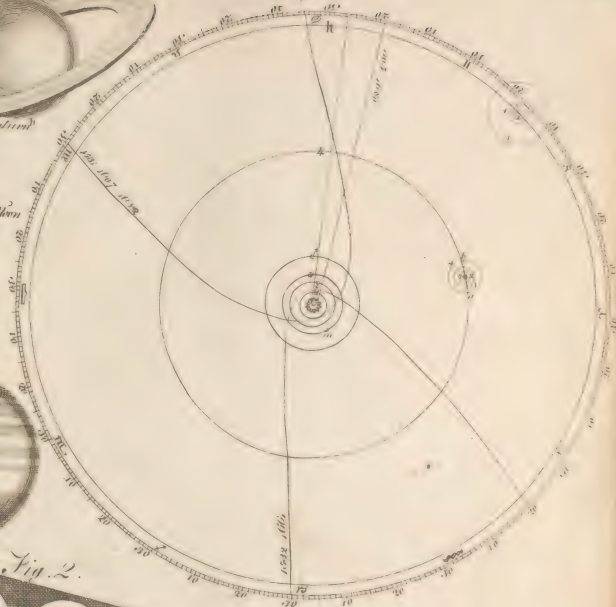
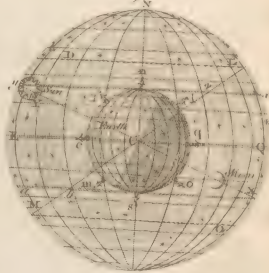


Fig. 6.



• shell sulph.



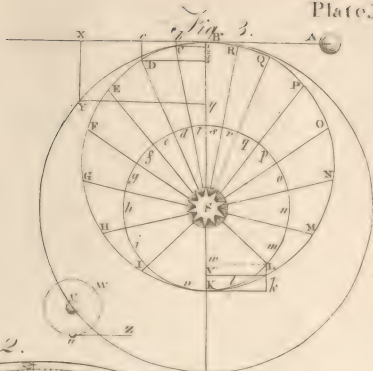
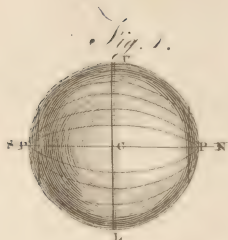
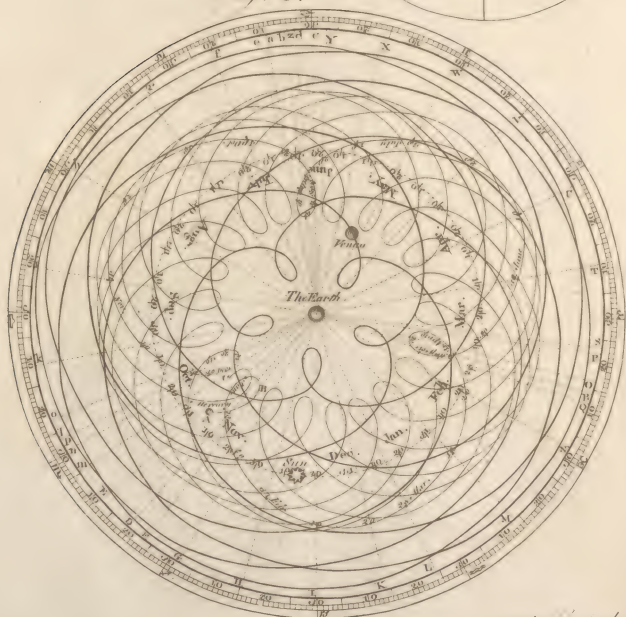


Fig. 2.



A. Bell's Suppl.

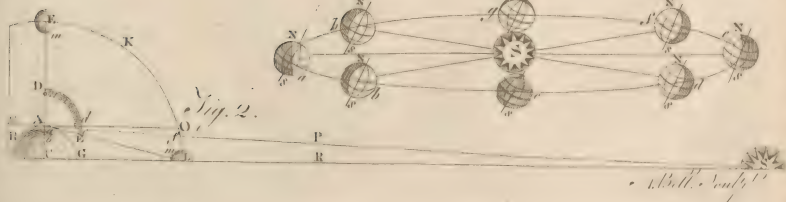
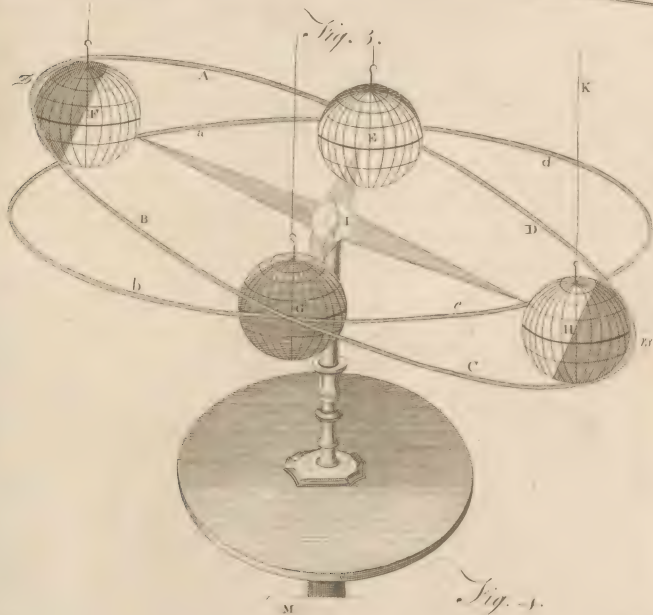
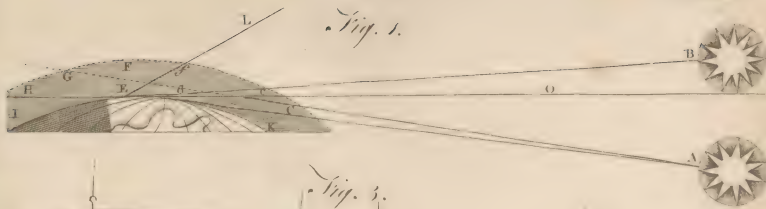




Fig. 1.

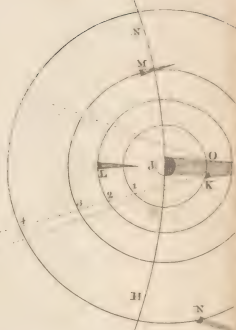
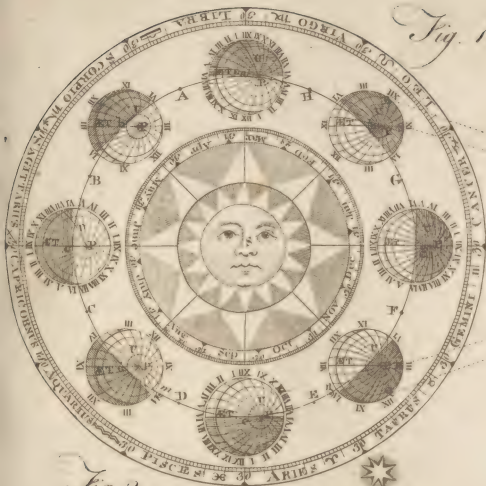


Fig. 2.



Fig. 3.

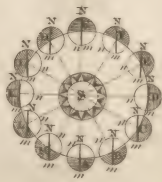


Fig. 4.

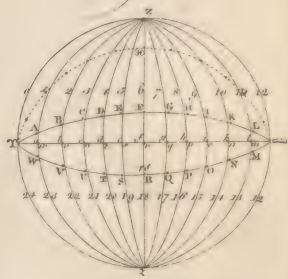


Fig. 1.

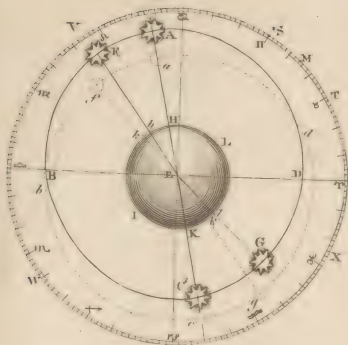


Fig. 2.

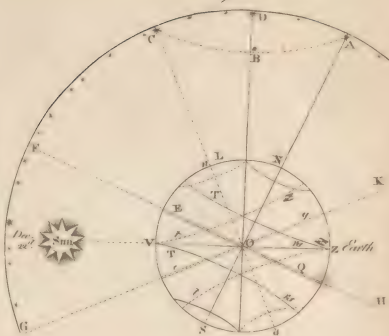


Fig. 3.

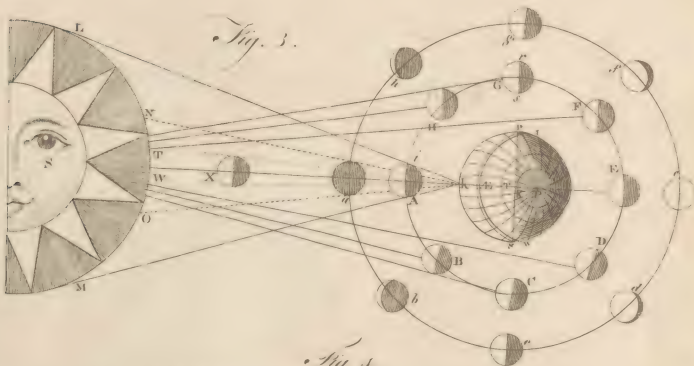


Fig. 4.

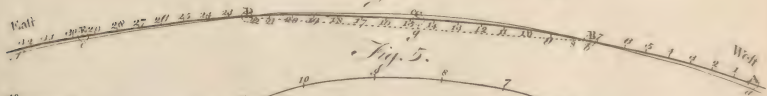


Fig. 5.

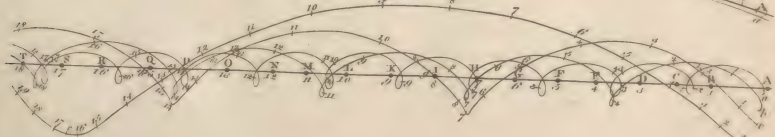




Fig. 1.

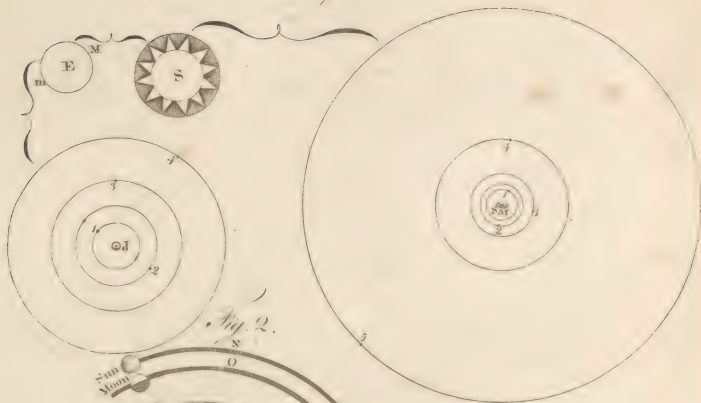


Fig. 2.



Fig. 3.

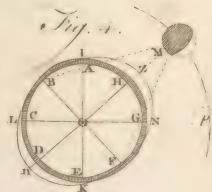
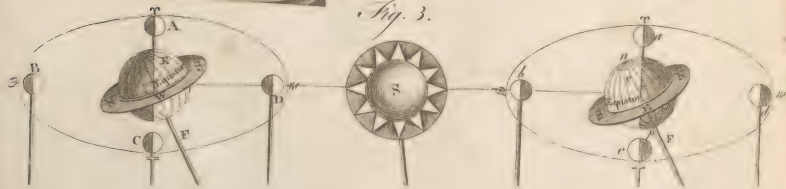
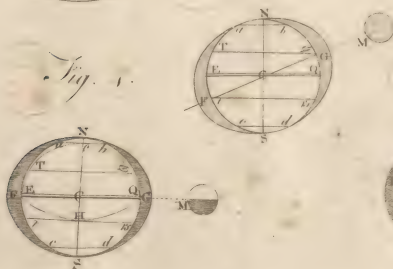
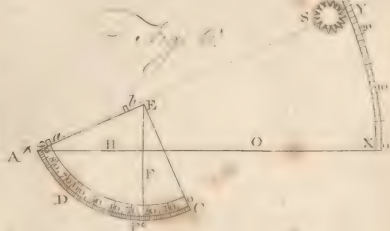
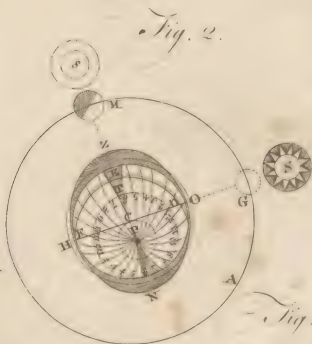
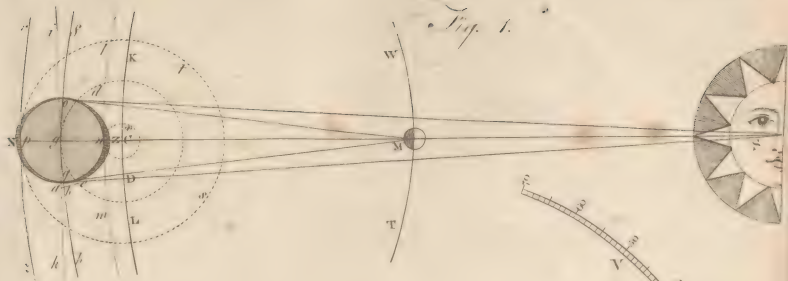
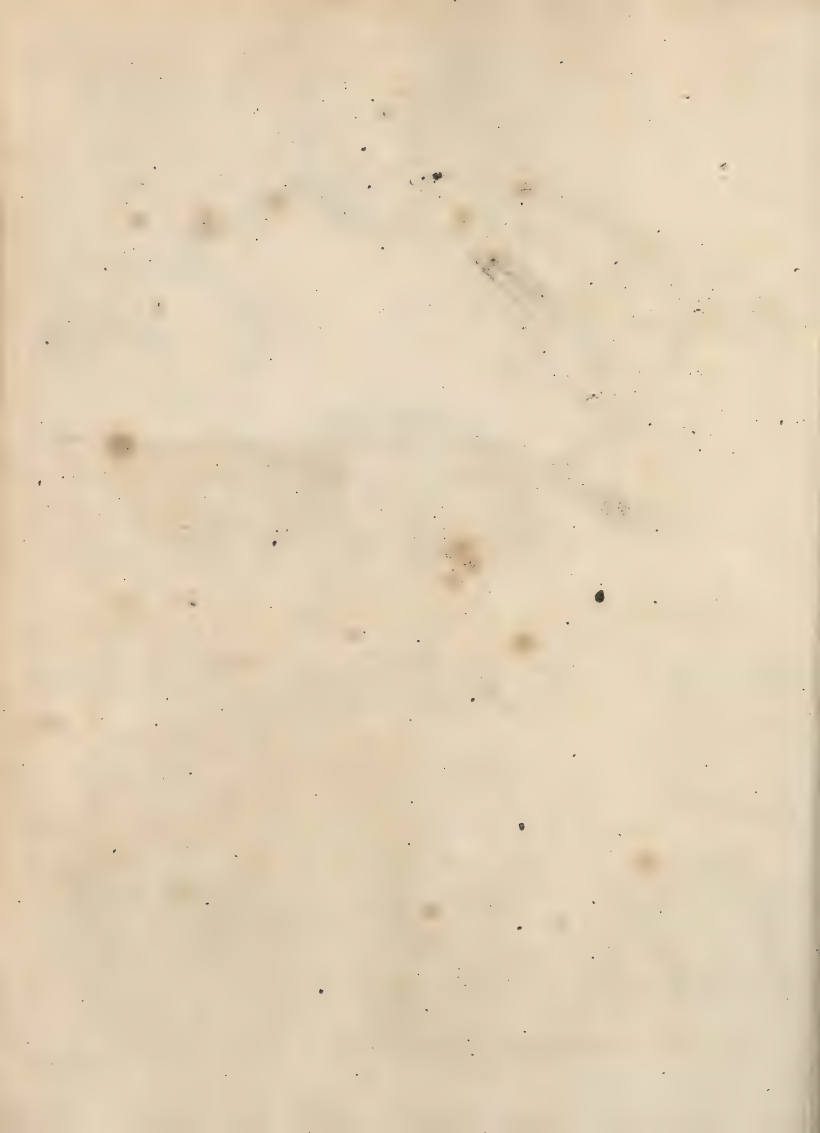


Fig. 3.









2^d Plate L.

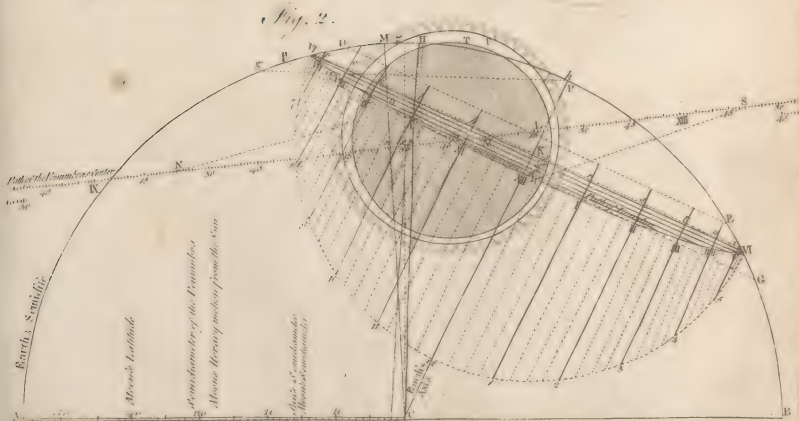
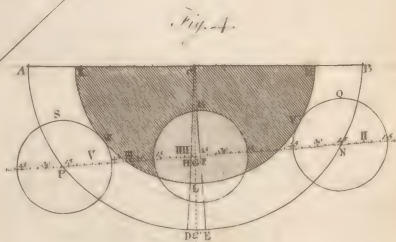
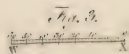
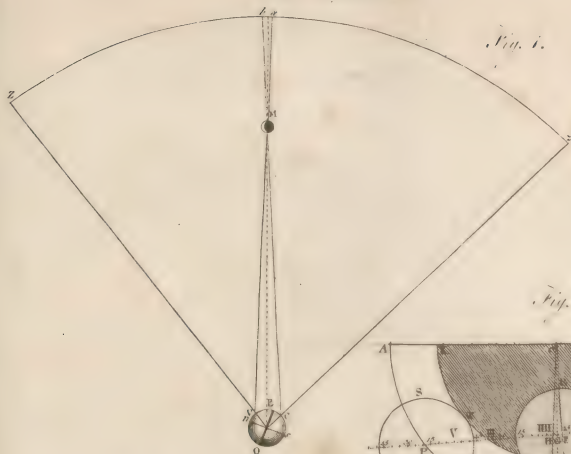




Fig. 1.



Fig. 2.

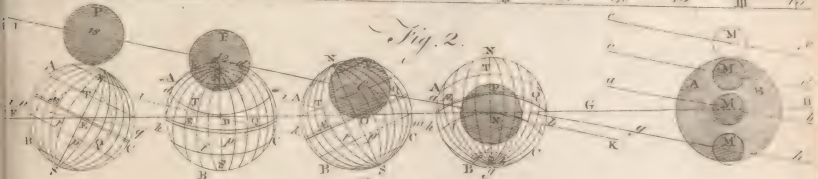
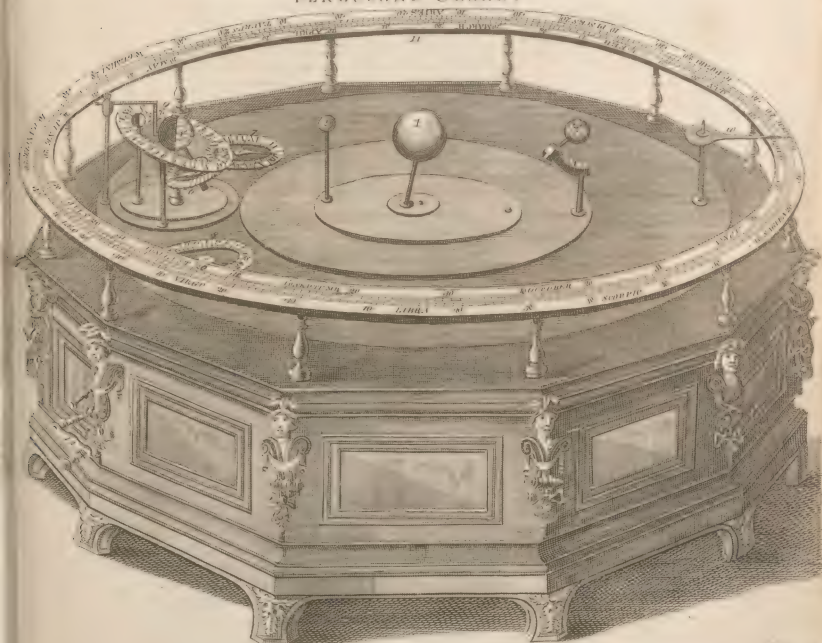


Fig. 3
FERGUSON'S ORRERY



and the moon being then oppofite to the fun, muft have been juft as near her defending node, and was there- fore eclipfed.

The elements for conftituting an eclipse of the moon, are eight in number, as follow:

1. The true time of full moon; and at that time,
2. The moon's horizontal parallax. 3. The fun's femidiameter. 4. The moon's. 5. The femidiameter of the earth's shadow at the moon. 6. The moon's latitude. 7. The angle of the moon's vifible path with the ecliptic. 8. The moon's true horary motion from the fun.—Therefore,

1. To find the true time of new or full moon. Work as already taught in the precepts.—Thus we have the true time of full moon in May 1762 (fee example II. page 830) on the 8th day, at 50 minutes 50 feconds paft three o'clock in the morning.

2. To find the moon's horizontal parallax. Enter Table XVII. with the moon's mean anomaly (at the above full) 9° 2' 42' 42", and thereby take out her horizontal parallax; which by making the requifite proportions, will be found to be 57' 23".

3. 4. To find the femidiameters of the fun and moon. Enter Table XVII. with their refpective anomalies, the fun's being 10° 7' 27' 45" (by the above example) and the moon's 9° 2' 42' 42"; and thereby take out their refpective femidiameters; the fun's 15' 56", and the moon's 15' 38".

5. To find the femidiameter of the earth's shadow at the moon. Add the fun's horizontal parallax, which is always 10", to the moon's which in the prefent cafe is 57' 23", the fum will be 57' 33", from which fubtract the fun's femidiameter 15' 56", and there will remain 41' 37" for the femidiameter of that part of the earth's shadow which the moon then paffes through.

6. To find the moon's latitude. Find the fun's true diftance from the afcending node (as already taught in page 834) at the true time of full moon; and this diftance increafed by fix figns, will be the moon's true diftance from the fame node; and confequently the argument for finding her true latitude, as fhewn in page 834.

Thus, in example II. the fun's mean diftance from the afcending node was 0° 4' 49' 35", at the time of mean full moon: but it appears by the example, that the true time thereof was fix hours 33 minutes 38 feconds fooner than the mean time; and therefore we muft fubtract the fun's motion from the node (found in Table XII.) during this interval, from the above mean diftance 0° 4' 49' 35", in order to have his mean diftance from it at the true time of full moon. Then to this apply the equation of his mean diftance from the node, found in Table XV. by his mean anomaly 10° 7' 27' 45"; and laftly add fix figns: fo fhall the moon's true diftance from the afcending node be found as follows:

	s	o	'	"
Sun from node at mean full moon	0	4	49	35
His motion from it in { 6 hours				15 35
{ 33 minutes				1 26
{ 38 seconds				2
Sum, subtract from the uppermost line				17 3
Remains his mean distance at true full moon — — —	0	4	32	32

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Equation of his mean diftance, add

	s	o	'	"
Sun's true diftance from the node	0	6	10	32
To which add	6	0	0	0

And the fum will be

6	6	10	32
---	---	----	----

Which is the moon's true diftance from her afcending node at the true time of her being full; and confequently the argument for finding her true latitude at that time.—Therefore, with this argument, enter Table XVI. making proportions between the latitudes belonging to the 6th and 7th degree of the argument at the left hand (the figns being at top) for the 10' 32" and it will give 32' 21" for the moon's true latitude, which appears by the table to be fourth defending.

7. To find the angle of the moon's vifible path with the ecliptic. This may be flated at 5° 35', without any error of confequence in the projection of the ecliptic.

8. To find the moon's true horary motion from the fun. With their refpective anomalies take out their horary motions from Table XVII. and the fun's horary motion fubtracted from the moon's, leaves remaining the moon's true horary motion from the fun: in the prefent cafe 30' 52".

Now collect thefe elements together for ufe.

	D.	H.	M.	S.
1. True time of full moon in } May, 1762	8	3	50	50
2. Moon's horizontal parallax		0	57	23
3. Sun's femidiameter		0	15	56
4. Moon's femidiameter		0	15	38
5. Semidiameter of the earth's shadow } at the moon		0	41	37
6. Moon's true latitude, fouth defending		0	32	21
7. Angle of her vifible path with the } ecliptic		5	35	0
8. Her true horary motion from the fun		0	30	52

Thefe elements being found for the conftitution of the moon's eclipse in May, 1762, proceed as follows:

Make a fcale of any convenient length, as W X, 2^d Plate L. and divide it into 60 equal parts, each part ftanding fig. 3. for a minute of a degree.

Draw the right line ACB (fig. 4.) for part of the ecliptic, and CD perpendicular thereto for the fouth- ern part of its axis; the moon having fouth latitude.

Add the femidiameters of the moon and earth's shadow together, which, in this eclipse, will make 57' 15"; and take this from the fcale in your compaffes, and fetting one foot in the point C as a centre, with the other foot defcribe the femicircle ADB; in one point of which the moon's centre will be at the beginning of the ecliptic, and in another at the end thereof.

Take the femidiameter of the earth's shadow, 41' 37", in your compaffes from the fcale, and fetting one foot in the centre C, with the other foot defcribe the femicircle KLM for the fouthern half of the earth's shadow, becaufe the moon's latitude is fouth in this e- clipfe.

5 N

Make

Make CD equal to the radius of a line of chords on the sector, and set off the angle of the moon's visible path with the ecliptic, $5^{\circ} 35'$, from D to E, and draw the right line CFE for the southern half of the axis of the moon's orbit, lying to the right hand from the axis of the ecliptic CD, because the moon's latitude is south descending.—It would have been the same way (on the other side of the ecliptic) if her latitude had been north descending; but contrary in both cases, if her latitude had been either north ascending or south ascending.

Bisect the angle DCE by the right line Cg; in which line the true equal time of opposition of the sun and moon falls, as given by the tables.

Take the moon's latitude, $32^{\circ} 21''$, from the scale with your compasses, and set it from C to G, in the line CG; and through the point G, at right angles to CFE, draw the right line PHGN for the path of the moon's centre. Then, F shall be the point in the earth's shadow, where the moon's centre is at the middle of the eclipse; G, the point where her centre is at the tabular time of her being full; and H, the point where her centre is at the instant of her ecliptical opposition.

Take the moon's horary motion from the sun, $30' 52''$, in your compasses from the scale; and with that extent make marks along the line of the moon's path PGN: then divide each space from mark to mark, into 60 equal parts, or horary minutes, and set the hours to the proper dots in such a manner, that the dot signifying the instant of full moon (viz. 50 minutes 50 seconds after III in the morning) may be in the point G, where the line of the moon's path cuts the line that bisects the angle DCE.

Take the moon's semidiameter, $15' 38''$, in your compasses from the scale, and with that extent, as a radius, upon the points N, F, and P, as centres, describe the circle Q for the moon at the beginning of the eclipse, when she touches the earth's shadow at V; the circle R for the moon at the middle of the eclipse; and the circle S for the moon at the end of the eclipse, just leaving the earth's shadow at W.

The point N denotes the instant when the eclipse began, namely, at 15 minutes 10 seconds after II in the morning; the point F the middle of the eclipse at 47 minutes 44 seconds past III; and the point P the end of the eclipse, at 18 minutes after V.—At the greatest obscuration the moon was 10 digits eclipsed.

SECT. XI. *The method of finding the Longitude by the Eclipses of Jupiter's Satellites: The amazing Velocity of Light demonstrated by these Eclipses; and of Cometary Eclipses.*

In the former section, having explained at great length, how eclipses of the sun and moon happen at certain times, it must be evident, that similar eclipses will be observed by the inhabitants of Jupiter and Saturn, which are attended by so many moons. These eclipses indeed very frequently happen to the satellites of Jupiter; and as they are of the greatest service in determining the longitudes of places on this earth, astronomers have been at great pains to calculate tables for the eclipses of these satellites by their primary, for the satellites themselves have never been observed to eclipse one another. The construction of such tables

is indeed much easier for these satellites than of any other celestial bodies, as their motions are much more regular.

The English tables are calculated for the meridian of Greenwich, and by these it is very easy to find how many degrees of longitude any place is distant either east or west from Greenwich; for, let an observer, who has these tables, with a good telescope and a well-regulated clock at any other place of the earth, observe the beginning or ending of an eclipse of one of Jupiter's satellites, and note the precise moment of time that he saw the satellite either immerge into, or emerge out of the shadow, and compare that time with the time shewn by the tables for Greenwich; then 15 degrees difference of longitude being allowed for every hour's difference of time, will give the longitude of that place from Greenwich; and if there be any odd minutes of time, for every minute a quarter of a degree, east or west, must be allowed, as the time of observation is later or earlier than the time shewn by the tables. Such eclipses are very convenient for this purpose at land, because they happen almost every day; but are of no use at sea, because the rolling of the ship hinders all nice telescopic observations.

To explain this by a figure, in Plate XLVI. fig. 1. let J be Jupiter, K, L, M, N his four satellites in their respective orbits, 1, 2, 3, 4; and let the earth be at F (suppose in November, altho' that month is no otherwise material than to find the earth readily in this scheme, where it is shewn in eight different parts of the orbit). Let Q be a place on the meridian of Greenwich, and R a place on some other meridian eastward from Greenwich. Let a person at R observe the instantaneous vanishing of the first satellite K into Jupiter's shadow, suppose at three o'clock in the morning; but by the tables he finds the immersion of that satellite to be at midnight at Greenwich; he then can immediately determine, that as there are three hours difference of time between Q and R, and that R is three hours forward in reckoning than Q, it must be 45 degrees of east longitude from the meridian of Q. Were this method as practicable at sea as at land, any sailor might almost as easily, and with equal certainty, find the longitude as the latitude.

Whilst the earth is going from C to F in its orbit, only the immersions of Jupiter's satellites into his shadow are generally seen; and their emergences out of it while the earth goes from G to B. Indeed, both these appearances may be seen of the second, third, and fourth satellite when eclipsed, whilst the earth is between D and E, or between G and A; but never of the first satellite, on account of the smallness of its orbit and the bulk of Jupiter, except only when Jupiter is directly opposite to the sun, that is, when the earth is at G; and even then, strictly speaking, we cannot see either the immersions or emergences of any of his satellites, because his body being directly between us and his conical shadow, his satellites are hid by his body a few moments before they touch his shadow; and are quite emerged from thence before we can see them, as it were just dropping from him. And when the earth is at C, the sun, being between it and Jupiter, hides both him and his moons from us.

In this diagram, the orbits of Jupiter's moons are drawn

drawn in true proportion to his diameter; but in proportion to the earth's orbit, they are drawn vastly too large.

In whatever month of the year Jupiter is in conjunction with the sun, or in opposition to him, in the next year it will be a month later at least. For whilst the earth goes once round the sun, Jupiter describes a twelfth part of his orbit. And therefore, when the earth has finished its annual period, from being in a line with the sun and Jupiter, it must go as much forward as Jupiter has moved in that time, to overtake him again; just like the minute hand of a watch, which must, from any conjunction with the hour-hand, go once round the dial-plate and somewhat above a twelfth part more, to overtake the hour-hand again.

264
Velocity of
light.

It is found by observation, that when the earth is between the sun and Jupiter, as at G, his satellites are eclipsed about 8 minutes sooner than they should be according to the tables; and when the earth is at B or C, these eclipses happen about 8 minutes later than the tables predict them. Hence it is undeniably certain, that the motion of light is not instantaneous, since it takes about $16\frac{1}{2}$ minutes of time to go through a space equal to the diameter of the earth's orbit, which is 180,000,000 of miles in length; and consequently the particles of light fly almost 200,000 miles every second of time, which is above a million of times swifter than the motion of a cannon bullet. And as light is $16\frac{1}{2}$ minutes in travelling across the earth's orbit, it must be $8\frac{1}{2}$ minutes in coming from the sun to us: therefore if the sun were annihilated, we should see him for $8\frac{1}{2}$ minutes after; and if he were again created, he would be $8\frac{1}{2}$ minutes old before we could see him.

To illustrate this progressive motion of light, (Plate XLVI. fig. 2.), let A and B be the earth in two different parts of its orbit, whose distance from each other is 95,000,000 of miles, equal to the earth's distance from the sun S. It is plain, that if the motion of light were instantaneous, the satellite 1 would appear to enter into Jupiter's shadow FF at the same moment of time to a spectator in A, as to another in B. But by many years observations it has been found, that the immersion of the satellite into the shadow is seen $8\frac{1}{2}$ minutes sooner when the earth is at B, than when it is at A. And so, as Mr. Roemer first discovered, the motion of light is thereby proved to be progressive, and not instantaneous, as was formerly believed. It is easy to compute in what time the earth moves from A to B; for the chord of 60 degrees of any circle is equal to the semidiameter of that circle; and as the earth goes through all the 360 degrees of its orbit in a year, it goes through 60 of those degrees in about 61 days. Therefore, if on any given day, suppose the first of June, the earth is at A, on the first of August it will be at B; the chord, or straight line AB, being equal to DS the radius of the earth's orbit, the same with AS its distance from the sun.

As the earth moves from D to C, through the side AB of its orbit, it is constantly meeting the light of Jupiter's satellites sooner, which occasions an apparent acceleration of their eclipses; and as it moves through the other half H of its orbit, from C to D, it is receding from their light, which occasions an apparent retardation of their eclipses, because their light is then

longer before it overtakes the earth.

That these accelerations of the immersions of Jupiter's satellites into his shadow, as the earth approaches towards Jupiter, and the retardations of their immersions out of his shadow, as the earth is going from him, are not occasioned by any inequality arising from the motions of the satellites in excentric orbits, is plain, because it affects them all alike, in whatever parts of their orbits they are eclipsed. Besides, they go often round their orbits every year, and their motions are no way commensurate to the earth's. Therefore, a phenomenon not to be accounted for from the real motions of the satellites, but so easily deducible from the earth's motion, and so answerable thereto, must be allowed to result from it. This affords one very good proof of the earth's annual motion.

285
Acceleration of the eclipses not owing to any inequality in the motions of the satellites.

From what we have said in general concerning eclipses, it is plain that secondary planets are not the only bodies that may occasion them. The primary planets would eclipse one another, were it not for their great distances; but as the comets are not subject to the same laws with the planets, it is possible they may sometimes approach so near to the primary planets, as to cause an eclipse of the sun to those planets; and as the body of a comet bears a much larger proportion to the bulk of a primary planet than any secondary, it is plain that a cometary eclipse would both be of much longer continuance, and attended with much greater darkness, than that occasioned by a secondary planet. This behaved to be the case at any rate: but if we suppose the primary planet and comet to be moving both the same way, the duration of such an eclipse would be prodigiously lengthened; and thus, instead of four minutes, the sun might be totally darkened to the inhabitants of certain places for as many hours. Hence we may account for that prodigious darkness which we sometimes read of in history at times when no eclipse of the sun by the moon could possibly happen (see N^o 12). It is remarkable, however, that no comet hath ever been observed passing over the disk of the sun like a spot, as Venus and Mercury are; yet this must certainly happen, when the comet is in its perihelion, and the earth on the same side of its annual orbit. Such a phenomenon well deserves the watchful attention of astronomers, as it would be a greater confirmation of the planetary nature of comets, than any thing hitherto observed.

286
Eclipses by comets.

SECT. XII. *Of the Division of Time. A perpetual Table of New Moons. The Times of the Birth and Death of CHRIST: A Table of remarkable Eras or Events.*

THE parts of time are *Seconds, Minutes, Hours, Days, Years, Cycles, Ages, and Periods.* 287

The original standard, or integral measure of time, is a year; which is determined by the revolution of some celestial body in its orbit, viz. the sun or moon. 288

The time measured by the sun's revolution in the ecliptic, from any equinox or solstice to the same again, is called the *Solar or Tropical Year*, which contains 365 days, 5 hours, 48 minutes, 57 seconds; and is the only proper or natural year, because it always keeps the same seasons to the same months. 289

The quantity of time measured by the sun's revolution 5 N 2 290

tion, as from any fixed star to the same star again, is called the *sidereal year*; which contains 365 days 6 hours 9 minutes $14\frac{1}{2}$ seconds; and is 20 minutes $17\frac{1}{2}$ seconds longer than the true solar year.

291 The time measured by 12 revolutions of the moon, from the sun to the sun again, is called the *lunar year*: it contains 354 days 8 hours 48 minutes 36 seconds; and is therefore 10 days 21 hours 0 minutes 21 seconds shorter than the solar year. This is the foundation of the *epact*.

292 Civil year. The *civil year* is that which is in common use among the different nations of the world; of which, some reckon by the lunar, but most by the solar. The civil solar year contains 365 days, for three years running, which are called *common years*; and then comes in what is called the *bissextile* or *leap-year*, which contains 366 days. This is also called the *Julian year*, on account of Julius Cæsar, who appointed the intercalary day every fourth year, thinking thereby to make the civil and solar year keep pace together. And this day, being added to the 23^d of February, which in the Roman kalendar was the sixth of the kalends of March, that sixth day was twice reckoned, or the 23^d and 24th were reckoned as one day, and was called *bis sextus dies*; and thence came the name *bissextile* for that year. But in our common almanacs this day is added at the end of February.

293 Civil lunar year. The *civil lunar year* is also common or intercalary. The common year consists of 12 lunations, which contain 354 days; at the end of which, the year begins again. The *intercalary*, or *embolismic year* is that wherein a month was added, to adjust the lunar year to the solar. This method was used by the Jews, who kept their account by the lunar motions. But by intercalating no more than a month of 30 days, which they called *Ve-Adar*, every third year, they fell $3\frac{1}{2}$ days short of the solar year in that time.

The Romans also used the lunar embolismic year at first, as it was settled by Romulus their first king, who made it to consist only of 10 months or lunations, which fell 61 days short of the solar year, and so their year became quite vague and unfixed; for which reason, they were forced to have a table published by the high-priest, to inform them when the spring and other seasons began. But Julius Cæsar, as already mentioned, taking this troublesome affair into consideration, reformed the kalendar, by making the year to consist of 365 days 6 hours.

294 Calendar reformed by Julius Cæsar.

The year thus settled, is what we still make use of in Britain; but as it is somewhat more than 11 minutes longer than the solar tropical year, the times of the equinoxes go backward, and fall earlier by one

day in about 130 years. In the time of the Nicene council, (A. D. 325), which was 1444 years ago, the vernal equinox fell on the 21st of march; and if we divide 1444 by 130 it will quote 11, which is the number of days which the equinox has fallen back since the council of Nice. This causing great disturbances, by unfixing the times of the celebration of Easter, and consequently of all the other moveable feasts, Pope Gregory XIII. in the year 1582, ordered ten days to be at once struck out of that year; and the next day after the 4th of October was called the 15th. By this means the vernal equinox was restored to the 21st of March; and it was endeavoured, by the omission of three intercalary days in 400 years, to make the civil or political year keep pace with the solar for time to come. This new form of the year is called the *Gregorian account*, or *new stile*; which is received in all countries where the pope's authority is acknowledged, and ought to be in all places where truth is regarded.

296 The principal division of the year is into *months*, which are of two sorts, namely, *astronomical* and *civil*. The astronomical month is the time in which the moon runs through the zodiac, and is either *periodical* or *synodical*. The periodical month is the time spent by the moon in making one complete revolution from any point of the zodiac to the same again; which is 27^d 7^h 43^m.

The synodical month, called a *lunation*, is the time contained between the moon's parting with the sun at a conjunction, and returning to him again, which is 29^d 12^h 44^m. The civil months are those which are framed for the uses of civil life; and are different as to their names, number of days, and times of beginning, in several different countries. The first month of the Jewish year fell according to the moon in our August and September, old stile; the second in September and October; and so on. The first month of the Egyptian year began on the 29th of our August. The first month of the Arabic and Turkish year began the 16th of July. The first month of the Grecian year fell according to the moon in June and July, the second in July and August, and so on, as in the following table.

A month is divided into four parts called *weeks*, and a week into seven parts called *days*; so that in a Julian year there are 13 such months, or 52 weeks, and one day over. The Gentiles gave the names of the sun, moon, and planets, to the days of the week. To the first, the name of the *Sun*; to the second, of the *Moon*; to the third, of *Mars*; to the fourth, of *Mercury*; to the fifth, of *Jupiter*; to the sixth, of *Venus*; and to the seventh, of *Saturn*.

295 By Pope Gregory.

296 Months astronomical and civil.

297 Weeks.

N ^o	The Jewish year.	Days	N ^o	The Egyptian year.	Days
1	Tifri ————— Aug.—Sept.	30	1	Thoth ————— August 29	30
2	Marchefvan ——— Sept.—Oct.	29	2	Paophi ————— September 28	30
3	Caſeu ————— Oct.—Nov.	30	3	Athir ————— October 28	30
4	Tebeth ————— Nov.—Dec.	29	4	Chojac ————— November 27	30
5	Shebat ————— Dec.—Jan.	30	5	Tybi ————— December 27	30
6	Adar ————— Jan.—Feb.	29	6	Mechir ————— January 26	30
7	Nifan or Abib ——— Feb.—Mar.	30	7	Phamenoth ——— February 25	30
8	Jiar ————— Mar.—Apr.	29	8	Parmuthi ——— March 27	30
9	Sivan ————— Apr.—May	30	9	Pachon ————— April 26	30
10	Tamuz ————— May—June	29	10	Payni ————— May 26	30
11	Ab ————— June—July	30	11	Epiphi ————— June 25	30
12	Ehul ————— July—Aug.	29	12	Meſori ————— July 25	30
Days in the year —————		354	Epagomenæ or days added ———		5
In the embolismic year after Adar they added month called <i>Ve-Adar</i> of 30 days.			Days in the year —————		365

N ^o	The Arabic and Turkish year.	Days	N ^o	The ancient Grecian year.	Days
1	Muharram ————— July 16	30	1	Hecatombæon ————— June — July	30
2	Saphar ————— Auguſt 15	29	2	Metagitnion ————— July — Aug.	29
3	Rabia I. ————— Septemb 13	30	3	Boedromion ————— Aug.—Sept.	30
4	Rabia II. ————— October 13	29	4	Pyaneſſion ————— Sept.—Oct.	29
5	Jomada I. ————— Novemb. 11	30	5	Maimacterion ————— Oct. —Nov.	30
6	Jomada II. ————— Decemb. 11	29	6	Poſideon ————— Nov.—Dec.	29
7	Rajab ————— January 9	30	7	Gamelion ————— Dec.—Jan.	30
8	Shaſban ————— February 8	29	8	Anthelſterion ————— Jan.—Feb.	29
9	Ramadam ————— March 9	30	9	Elaphebolion ————— Feb.—Mar.	30
10	Shawal ————— April 8	29	10	Munichion ————— Mar.—Apr.	29
11	Dulhaadai ————— May 7	30	11	Thargelion ————— Apr.—May	30
12	Dulheggia ————— June 5	29	12	Schirrophorion ————— May — June	29
Days in the year —————		354	Days in the year —————		354
The Arabians add 11 days at the end of every year, which keep the ſame months to the ſame ſeaſons.					

A day is either natural or artificial. The natural day contains 24 hours; the artificial the time from ſun-riſe to ſun-ſet. The natural day is either *aſtronomical* or *civil*. The aſtronomical day begins at noon, becauſe the increaſe and decreaſe of days terminated by the horizon are very unequal among themſelves; which inequality is likewiſe augmented by the inconfancy of the horizontal refractions, and therefore the aſtronomer takes the meridian for the limit of diurnal revolutions, reckoning noon, that is, the inſtant when the ſun's centre is on the meridian, for the beginning of the day. The Britiſh, French, Dutch, Germans, Spaniards, Portugueſe, and Egyptians, begin the civil day at midnight; the ancient Greeks, Jews, Bohemian's, Sileſians, with the modern Italians, and Chineſe, begin it at ſun-ſetting; and the ancient Babylonians, Perſians, Syrians, with the modern Greeks, at ſun-riſing.

An hour is a certain determinate part of the day, and is either equal or unequal. An equal hour is the 24th part of a mean natural day, as ſhewn by well regulated clocks and watches: but theſe hours are not quite equal as meaſured by the returns of the ſun to the meridian, becauſe of the obliquity of the ecliptic and ſun's

unequal motion in it. Unequal hours are thoſe by which the artificial day is divided into twelve parts, and the night into as many.

An hour is divided into 60 equal parts called *minutes*, ſeconds, &c. a minute into 60 equal parts called *ſeconds*, and theſe again into 60 equal parts called *thirds*. The Jews, Chaldeans, and Arabians, divide the hour into 1080 equal parts called *ſcruples*; which number contains 18 times 60, ſo that one minute contains 18 ſcruples.

A cycle is a perpetual round, or circulation of the ſame parts of time of any ſort. The cycle of the ſun is a revolution of 28 years, in which time the days of the months return again to the ſame days of the week; the ſun's place to the ſame ſigns and degrees of the ecliptic on the ſame months and days, ſo as not to differ one degree in 100 years; and the leap-years begin the ſame courſe over again with reſpect to the days of the week on which the days of the months fall. The cycle of the moon, commonly called the *golden number*, is a revolution of 19 years; in which time, the conjunctions, oppoſitions, and other aſpects of the moon, are within an hour and half of being the ſame as they were on the ſame days of the months 19 years before. The *indiction*

303
Cycles.
304
Golden
number.

indiction is a revolution of 15 years, used only by the Romans for indicating the times of certain payments made by the subjects to the republic: It was established by Constantine, A. D. 312.

305
To find the year of any cycle.

The year of our Saviour's birth, according to the vulgar era, was the 9th year of the solar cycle, the first year of the lunar cycle, and the 312th year after his birth was the first year of the Roman indiction. Therefore, to find the year of the solar cycle, add 9 to any given year of Christ, and divide the sum by 28, the quotient is the number of cycles elapsed since his birth, and the remainder is the cycle for the given year: If nothing remains, the cycle is 28. To find the lunar cycle, add 1 to the given year of Christ, and divide the sum by 19; the quotient is the number of cycles elapsed in the interval, and the remainder is the cycle for the given year: If nothing remains, the cycle is 19. Lastly, subtract 312 from the given year of Christ, and divide the remainder by 15; and what remains after this division is the indiction for the given year: If nothing remains, the indiction is 15.

306
Variation of the golden numbers.

Although the above deficiency in the lunar cycle of an hour and an half every 19 years be but small, yet in time it becomes so sensible as to make a whole natural day in 310 years. So that, although this cycle be of use, when the golden numbers are rightly placed against the days of the months in the calendar, as in the Common Prayer Books, for finding the days of the mean conjunctions or oppositions of the sun and moon, and consequently the time of Easter; it will only serve for 310 years, old stile. For as the new and full moons anticipate a day in that time, the golden numbers ought to be placed one day earlier in the calendar for the next 310 years to come. These numbers were rightly placed against the days of new moon in the calendar, by the council of Nice, A. D. 325; but the anticipation, which has been neglected ever since, is now grown almost into 5 days: And therefore, all the golden numbers ought now to be placed 5 days higher in the calendar for the old stile than they were at the time of the said council; or 6 days lower for the new stile, because at present it differs 11 days from the old.

307
To find the golden number.

In the following table the golden numbers under the months stand against the days of new moon in the left-hand column, for the new stile; adapted chiefly to the second year after leap-year, as being the nearest mean for all the four; and will serve till the year 1900. Therefore, to find the day of new moon in any month of a given year till that time, look for the golden number of that year under the desired month, and against it you have the day of new moon in the left-hand column. Thus, suppose it were required to find the day of new moon in September 1769; the golden number for that year is 3, which I look for under September, and right against it in the left-hand column you will find 30, which is the day of new moon in that month. *N. B.* If all the golden numbers, except 17 and 6, were set one day lower in the table, it would serve from the beginning of the year 1900 till the end of the year 2199. The table at the end of this section shews the golden number for 4000 years after the birth of Christ, by looking for the even hundreds of any given year at the left hand, and for the rest to make up that year at the head of the table; and where the columns meet, you have the golden number (which is the same both

in old and new stile) for the given year. Thus, suppose the golden number was wanted for the year 1769; look for 1700 at the left hand of the table, and for 69 at the top of it; then guiding your eye downward from 69 to over-against 1700, you will find 3, which is the golden number for that year.

But because the lunar cycle of 19 years sometimes includes five leap-years, and at other times only four, this table will sometimes vary a day from the truth in leap-years after February. And it is impossible to have one more correct, unless we extend it to four times 19 or 76 years; in which there are 19 leap-years without a remainder. But even then to have it of perpetual use, it must be adapted to the old stile; because, in every centennial year not divisible by 4, the regular course of leap-years is interrupted in the new; as will be the case in the year 1800.

The cycle of Easter, also called the *Dionysian period*, is a revolution of 532 years, found by multiplying the solar cycle 28 by the lunar cycle 19. If the new moons did not anticipate upon this cycle, Easter-day would always be the Sunday next after the first full moon, which follows the 21st of March. But, on account of the above anticipation, to which no proper regard was had before the late alteration of the stile, the ecclesiastic Easter has several times been a week different from the true Easter within this last century: which inconvenience is now remedied by making the table, which used to find Easter for ever, in the Common Prayer Book, of no longer use than the lunar difference from the new stile will admit of.

The earliest Easter possible is the 22^d of March, the latest the 25th of April. Within these limits are 35 days, and the number belonging to each of them is called the *number of direction*; because thereby the time of Easter is found for any given year.

The first seven letters of the alphabet are commonly placed in the annual almanacs, to shew on what days of the week the days of the months fall throughout the year. And because one of those seven letters must necessarily stand against Sunday, it is printed in a capital form, and called the *dominical letter*; the other six being inserted in small characters, to denote the other six days of the week. Now, since a common Julian year contains 365 days, if this number be divided by 7 (the number of days in a week) there will remain one day. If there had been no remainder, it is plain the year would constantly begin on the same day of the week: but since one remains, it is plain, that the year must begin and end on the same day of the week; and therefore the next year will begin on the day following.

Hence, when January begins on Sunday, A is the dominical or Sunday letter for that year: Then, because the next year begins on Monday, the Sunday will fall on the seventh day, to which is annexed the seventh letter G, which therefore will be the dominical letter for all that year: and as the third year will begin on Tuesday, the Sunday will fall on the sixth day; therefore F will be the Sunday letter for that year. Whence it is evident, that the Sunday letters will go annually in a retrograde order thus, G, F, E, D, C, B, A. And, in the course of seven years, if they were all common ones, the same days of the week and dominical letters would return to the same days of the months. But because there are 366 days in a leap-year, if this number

308
Dionysian period, cycle of 532 years.

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310
Dominical letter.

ber

ber be divided by 7, there will remain two days over and above the 52 weeks of which the year consists. And therefore, if the leap-year begins on Sunday, it will end on Monday; and the next year will begin on Tuesday, the first Sunday whereof must fall on the sixth of January, to which is annexed the letter F, and not G, as in common years. By this means, the leap-year returning every fourth year, the order of the dominical letters is interrupted; and the series cannot return to its first state till after four times seven, or 28 years; and then the same days of the months return in order to the same days of the week as before.

(for no later could all the three cycles begin together), and it is not yet completed: And therefore it includes all other cycles, periods, and eras. There is but one year in the whole period that has the same numbers for the three cycles of which it is made up: And therefore, if historians had remarked in their writings the cycles of each year, there had been no dispute about the time of any action recorded by them.

The Dionysian or vulgar æra of Christ's birth was about the end of the year of the Julian period 4713; and consequently the first year of his age, according to that account, was the 4714th year of the said period.

Therefore, if to the current year of Christ we add 4713, the sum will be the year of the Julian period. So the year 1769 will be found to be the 6482^d year of that period. Or, to find the year of the Julian period answering to any given year before the first year of Christ, subtract the number of that given year from 4714, and the remainder will be the year of the Julian period. Thus, the year 585 before the first year of Christ (which was the 584th before his birth) was the 4129th year of the said period. Lastly, to find the cycles of the sun, moon, and indiction for any given year of this period, divide the given year by 28, 19, and 15; the three remainders will be the cycles sought, and the quotients the numbers of cycles run since the beginning of the period. So in the above 4714th year of the Julian period, the cycle of the sun was 10, the cycle of the moon 2, and the cycle of indiction 4; the solar cycle having run through 168 courses, the lunar 248, and the indiction 314.

The vulgar æra of Christ's birth was never settled till the year 527, when Dionysius Exiguus, a Roman abbot, fixed it to the end of the 4713th year of the Julian period, which was four years too late. For our Saviour was born before the death of Herod, who sought to kill him as soon as he heard of his birth. And, according to the testimony of Josephus (*B. xvii. ch. 8.*) there was an eclipse of the moon in the time of Herod's last illness; which eclipse appears by our astronomical tables to have been in the year of the Julian period 4710, March 13th, at 3 hours past midnight, at Jerusalem. Now, as our Saviour must have been born some months before Herod's death, since in the interval he was carried into Egypt, the latest time in which we can fix the true æra of his birth is about the end of the 4709th year of the Julian period.

As there are certain fixed points in the heavens from which astronomers begin their computations, so there are certain points of time from which historians begin to reckon; and these points or roots of time are called *eras* or *epochs*. The most remarkable eras are, those of the Creation, the Greek Olympiads, the building of Rome, the æra of Nabonassar, the death of Alexander, the birth of Christ, the Arabian Hegira, and the Persian Jsedegird: All which, together with several others of less note, have their beginnings in the following table fixed to the years of the Julian period, to the age of the world at those times, and to the years before and after the year of Christ's birth.

Days.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	9		9	17	17	6				11		19
2		17			6	14	14	3	11		19	8
3	17	6	17	6			3	11		19	8	16
4	6		6	14	14	3			19	8		
5		14			3	11	11	19			16	
6	14	3	14	3			19			16	5	5
7	3			11	11	19	8	16	5	5	13	13
8		11			19	8	8	16	5	5	13	
9	11	19	11	19						13		2
10			19	8	8	16	16	5	13		2	10
11	19	8					5	13	2	2	10	
12	8	16	8	16	16	5			10		18	18
13					5	13	13	2	10	18	7	
14	16	5	16	5			2	10	18	18	7	
15	5		5	13	13	2				7		15
16		13			2	10	10	18	7		15	
17	13	2	13	2			18	7		15	4	4
18	2		2	10	10	18			15			12
19		10			18	7	7	15	4	4	12	
20	10	18	10	18			15			12	1	1
21	18		18	7	7	15		4	12			9
22		7			15	4	4	12	1	1	9	
23	7	15	7	15			12		9	17	17	6
24			15	4	4	12		1	9			
25	15	4			12		1	9	17	17	6	
26	4		4	12		1				6		15
27		12			1	9	9	17	6		14	
28	12	1	12		9		17	6	14	14	3	3
29	1		1	9		17	6	14	3		11	
30												
31	9		9			14	3			11		9

From the multiplication of the solar cycle of 28 years into the lunar cycle of 19 years, and the Roman indiction of 15 years, arises the great Julian period, consisting of 7980 years, which had its beginning 764 years before Strauchius's supposed year of the creation

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To find the year of the Julian period.

312
Year of Christ's birth when settled.

314
Æras or Epochs.

A Table of remarkable Eras and Events.

	Julian Period.	Y. of the World.	Before Christ.
315 1. The creation of the world	706	0	4007
2. The deluge, or Noah's flood	2362	1656	2351
3. The Assyrian monarchy founded by Nimrod	2537	1831	2176
4. The birth of Abraham	2714	2008	1999
5. The destruction of Sodom and Gomorrah	2816	2110	1897
6. The beginning of the kingdom of Athens by Cecrops	3157	2451	1556
7. Moses receives the ten commandments from God	3222	2516	1491
8. The entrance of the Israelites into Canaan	3262	2556	1451
9. The destruction of Troy	3529	2823	1184
10. The beginning of king David's reign	3650	2944	1063
11. The foundation of Solomon's temple	3701	2995	1012
12. The Argonautic expedition	3776	3070	937
13. Lycurgus forms his excellent laws	3829	3103	884
14. Arbaces, the first king of the Medes	3838	3132	875
15. Mandaucus, the second	3865	3159	848
16. Sotarnus, the third	3915	3209	798
17. The beginning of the Olympiads	3938	3232	775
18. Artica, the fourth king of the Medes	3945	3239	768
19. The Catonian epocha of the building of Rome	3961	3255	752
20. The æra of Nabonassar	3967	3261	746
21. The destruction of Samaria by Salmaneser	3992	3286	721
22. The first eclipse of the moon on record	3993	3287	720
23. Cardicea, the fifth king of the Medes	3996	3290	717
24. Phraortes, the sixth	4058	3352	655
25. Cyaxares, the seventh	4080	3374	633
26. The first Babylonish captivity by Nebuchadnezzar	4107	3401	606
27. The long war ended between the Medes and Lydians	4111	3405	602
28. The second Babylonish captivity, and birth of Cyrus	4114	3408	599
29. The destruction of Solomon's temple	4125	3419	588
30. Nebuchadnezzar struck with madness	4144	3438	569
31. Daniel's vision of the four monarchies	4158	3452	555
32. Cyrus begins to reign in the Persian empire	4177	3471	536
33. The battle of Marathon	4223	3517	490
34. Artaxerxes Longimanus begins to reign	4249	3543	464
35. The beginning of Daniel's seventy weeks of years	4256	3550	457
36. The beginning of the Peloponnesian war	4282	3576	431
37. Alexander's victory at Arbela	4383	3677	330
38. The death of Alexander	4390	3684	323
39. The captivity of 100,000 Jews by king Ptolemy	4393	3687	320
40. The colossus of Rhodes thrown down by an earthquake	4491	3785	222
41. Antiochus defeated by Ptolemy Philopater	4496	3790	217
42. The famous Archimedes murdered at Syracuse	4506	3800	207
43. Jason butchers the inhabitants of Jerusalem	4543	3837	170
44. Corinth plundered and burnt by consul Mummius	4567	3861	146
45. Julius Cæsar invades Britain	4659	3953	54
46. He corrects the calendar	4677	3961	46
47. Is killed in the Senate-house	4671	3965	42
48. Herod made king of Judea	4673	3967	40
49. Anthony defeated at the battle of Actium	4683	3977	30
50. Agrippa builds the Pantheon at Rome	4688	3982	25
51. The true æra of Christ's birth	4709	4003	4
52. The death of Herod	4710	4004	3
			After Christ.
53. The Dionysian, or vulgar æra of Christ's birth	4713	4007	0
54. The true year of his crucifixion	4746	4040	33
55. The destruction of Jerusalem	4783	4077	70
56. Adrian builds the long wall in Britain	4833	4127	120
57. Constantius defeats the Picts in Britain	5019	4313	306
58. The council of Nice	5038	4332	325
59. The death of Constantine the great	5050	4344	337
60. The Saxons invited into Britain	5158	4452	445
61. The Arabian Hegira	5335	4629	622

	Julian Period.	Y. of the World.	After Christ.
62. The death of Mohammed the pretended prophet	5343	4637	630
63. The Persian Yefdegird	5344	4638	631
64. The sun, moon, and all the planets, in Libra, Sep. 14. as seen from the earth	5899	5193	1186
65. The art of printing discovered	6153	5447	1440
66. The reformation begun by Martin Luther	6230	5524	1517

In fixing the year of the creation to the 706th year of the Julian period, which was the 4007th year before the year of Christ's birth, we have followed Mr Bedford in his scripture chronology, printed A. D. 1730, and Mr Kennedy in a work of the same kind, printed A. D. 1762.—Mr Bedford takes it only for granted that the world was created at the time of the autumnal equinox: But Mr Kennedy affirms, that the

faid equinox was at the noon of the fourth day of the creation-week, and that the moon was then 24 hours past her opposition to the sun.—If Moses had told us the same things, we should have had sufficient data for fixing the era of the creation: But as he has been silent on these points, we must consider the best accounts of chronologers as entirely hypothetical and uncertain.

TABLE, shewing the Golden Number, (which is the same both in the Old and New Style) from the Christian Era, to A. D. 4000.

		Years less than an hundred.																											
Hundreds of Years.		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
		38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
		76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99				
			=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
		0	1900	3800	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19						
	100	2000	3900	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5							
	200	2100	4000	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10							
	300	2200	&c.	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15							
	400	2300	—	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1							
	500	2400	—	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6							
	600	2500	—	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11							
	700	2600	—	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16							
	800	2700	—	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2							
	900	2800	—	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7							
	1000	2900	—	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12							
	1100	3000	—	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17							
	1200	3100	—	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3							
	1300	3200	—	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8							
	1400	3300	—	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13							
	1500	3400	—	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18							
	1600	3500	—	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4							
	1700	3600	—	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9							
	1800	3700	—	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14							

Se&t. XIII. A Description of the Astronomical Machinery serving to explain and illustrate the foregoing part of this Treatise.

THE ORRERY, (Plate LI. fig. 3.) This machine shews the motions of the sun, Mercury, Venus, earth, and moon; and occasionally the superior planets, Mars, Jupiter, and Saturn, may be put on; Jupiter's four satellites are moved round him in their proper times by a small winch; and Saturn has his five satellites, and his ring which keeps its parallelism round the sun; and by a lamp put in the sun's place, the ring shews all its various phases already described.

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In the centre, N° 1. represents the sun, supported by its axis, inclining almost 8 degrees from the axis of the ecliptic, and turning round in 25½ days on its axis, of which the north pole inclines toward the eighth degree of Pisces in the great ecliptic, (N° 11.), where-on the months and days are engraven over the signs and degrees in which the sun appears, as seen from the earth, on the different days of the year.

The nearest planet (N° 2.) to the sun is Mercury, which goes round him in 87 days 23 hours, or 87½ diurnal rotations of the earth; but has no motion round its axis in the machine, because the time of its diurnal motion in the heavens is not known to us.

5 O

The

The next planet in order is Venus, (N^o 3.), which performs her annual course in 224 days 17 hours, and turns round her axis in 24 days 8 hours, or in 24 $\frac{1}{2}$ diurnal rotations of the earth. Her axis inclines 75 degrees from the axis of the ecliptic, and her north pole inclines towards the 20th degree of Aquarius, according to the observations of Bianchini. She shews all the phenomena described in Sect. ii.

Next, without the orbit of Venus, is the earth, (N^o 4.), which turns round its axis, to any fixed point at a great distance, in 23 hours 56 minutes four seconds of mean solar time; but from the sun to the sun again, in 24 hours of the same time. N^o 6. is a sidereal dial-plate under the earth, and N^o 7. a solar dial-plate on the cover of the machine. The index of the former shews sidereal, and of the latter, solar time; and hence the former index gains one entire revolution on the latter every year, as 365 solar or natural days contain 366 fidereal days, or apparent revolutions of the stars. In the time that the earth makes 365 $\frac{1}{2}$ diurnal rotations on its axis, it goes once round the sun in the plane of the ecliptic; and always keeps opposite to a moving index (N^o 10.) which shews the sun's daily change of place, and also the days of the months.

The earth is half covered with a black cap, for dividing the apparently enlightened half next the sun from the other half, which, when turned away from him, is in the dark. The edge of the cap represents the circle bounding light and darkness, and shews at what time the sun rises and sets to all places throughout the year. The earth's axis inclines 23 $\frac{1}{2}$ degrees from the axis of the ecliptic; the north pole inclines toward the beginning of Cancer, and keeps its parallelism throughout its annual course; so that in summer the northern parts of the earth incline towards the sun, and in winter from him: by which means, the different lengths of days and nights, and the cause of the various seasons, are demonstrated to sight.

There is a broad horizon, to the upper side of which is fixed a meridian femicircle in the north and south points, graduated on both sides from the horizon to 90° in the zenith or vertical point. The edge of the horizon is graduated from the east and west to the south and north points, and within these divisions are the points of the compass. From the lower side of this thin horizontal plate stand out four small wires, to which is fixed a twilight-circle 18 degrees from the graduated side of the horizon all round. This horizon may be put upon the earth, (when the cap is taken away), and rectified to the latitude of any place; and then by a small wire called the *solar ray*, which may be put on so as to proceed directly from the sun's centre towards the earth's, but to come no farther than almost to touch the horizon. The beginning of twilight, time of sun-rising, with his amplitude, meridian altitude, time of setting, amplitude then, and end of twilight, are shewn for every day of the year, at that place to which the horizon is rectified.

The moon (N^o 5.) goes round the earth, from between it and any fixed point at a great distance, in 27 days 7 hours 43 minutes, or through all the signs and degrees of her orbit, which is called her *periodical revolution*; but she goes round from the sun to the sun again, or from change to change, in 29 days 12 hours 45 minutes, which is her *synodical revolution*; and in

that time she exhibits all the phases already described.

When the abovementioned horizon is rectified to the latitude of any given place, the times of the moon's rising and setting, together with her amplitude, are shewn to that place as well as the sun's; and all the various phenomena of the harvest-moon are made obvious to sight.

The moon's orbit (N^o 9.) is inclined to the ecliptic (N^o 11.), one half being above, and the other below it. The nodes, or points at o and o, lie in the plane of the ecliptic, as before described, and shift backward through all its lines and degrees in 18 $\frac{1}{2}$ years. The degrees of the moon's latitude to the highest at NL (north latitude) and lowest at SL (south latitude), are engraven both ways from her nodes at o and o, and as the moon rises and falls in her orbit according to its inclination, her latitude and distance from her nodes are shewn for every day, having first rectified her orbit so as to set the nodes to their proper places in the ecliptic; and then as they come about at different and almost opposite times of the year, and then point towards the sun, all the eclipses may be shewn for hundreds of years, (without any new rectification), by turning the machinery backward for time past, or forward for time to come. At 17 degrees distance from each node, on both sides is engraved a small sun; and at 12 degrees distance, a small moon, which shew the limits of solar and lunar eclipses; and when, at any change the moon falls between either of these sun's and the node, the sun will be eclipsed on the day pointed to by the annual index, (N^o 10.); and as the moon has then north or south latitude, one may easily judge whether that eclipse will be visible in the northern or southern hemisphere: especially as the earth's axis inclines toward the sun or from him at that time. And when at any full, the moon falls between either of the little moon's and node, she will be eclipsed, and the annual index shews the day of that eclipse. There is a circle of 29 $\frac{1}{2}$ equal parts (N^o 8.) on the cover of the machine, on which an index shews the days of the moon's age.

There are two femicircles (Plate LII. fig. 1.) fixed to an elliptical ring, which being put like a cap upon the earth, and the forked part F upon the moon, shews the tides as the earth turns round within them, and they are led round it by the moon. When the different places come to the femicircle AaEB, they have tides of flood; and when they come to the femicircle CED, they have tides of ebb; the index on the hour circle (N^o 7. Plate LI.) shewing the times of these phenomena.

There is a jointed wire, of which one end being put into a hole in the upright stem that holds the earth's cap, and the wire laid into a small forked piece which may be occasionally put upon Venus or Mercury, shews the direct and retrograde motions of these two planets, with their stationary times and places, as seen from the earth.

The whole machinery is turned by a winch or handle (N^o 12.), and is so easily moved, that a clock might turn it without any danger of stopping.

To give a plate of the wheel-work of this machine, would answer no purpose, because many of the wheels lie so behind others as to hide them from sight in any view whatever.

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THE COMETARIUM, (Plate LII. fig. 2.) This curious machine shews the motion of a comet or excentric body moving round the sun, describing equal areas in equal times, and may be so contrived as to shew such a motion for any degree of excentricity. It was invented by the late Dr Defaguliers.

The dark elliptical groove round the letters *abcdeffghi* *klm* is the orbit of the comet Y; this comet is carried round in the groove according to the order of letters, by the wire W fixed in the sun S, and slides in the wire as it approaches nearer to or recedes farther from the sun, being nearest of all in the perihelion *a*, and farthest in the aphelion *g*. The areas, *aSb*, *bSc*, *cSd*, &c. or contents of these several triangles, are all equal; and in every turn of the winch N, the comet Y is carried over one of these areas; consequently, in as much time as it moves from *f* to *g*, or from *g* to *h*, it moves from *m* to *a*, or from *a* to *b*; and so of the rest, being quickest of all at *a*, and slowest at *g*. Thus the comet's velocity in its orbit continually decreases from the perihelion *a* to the aphelion *g*; and increases in the same proportion from *g* to *a*.

The elliptic orbit is divided into 12 equal parts or signs, with their respective degrees, and so is the circle *mopqrstu*, which represents a great circle in the heavens, and to which the comet's motion is referred by a small knob on the point of the wire W. Whilst the comet moves from *f* to *g* in its orbit, it appears to move only about five degrees in this circle, as is shewn by the small knob on the end of the wire W; but in as short time as the comet moves from *m* to *a*, or from *a* to *b*, it appears to describe the large space *tn* or *no* in the heavens, either of which spaces contains 120 degrees, or four signs. Were the excentricity of its orbit greater, the greater still would be the difference of its motion, and *vice versa*.

ABCDEFGHIKLMA is a circular orbit for shewing the equable motion of a body round the sun S, describing equal areas ASB, BSC, &c. in equal times with those of the body Y in its elliptical orbit above mentioned; but with this difference, that the circular motion describes the equal arcs AB, BC, &c. in the same equal times that the elliptical motion describes the unequal arcs, *ab*, *bc*, &c.

Now, suppose the two bodies Y and I to start from the points *a* and A at the same moment of time, and, each having gone round its respective orbit, to arrive at these points again at the same instant, the body Y will be forwarder in its orbit than the body I all the way from *a* to *g*, and from A to G; but I will be forwarder than Y through all the other half of the orbit; and the difference is equal to the equation of the body Y in its orbit. At the points *a*A, and *g*G, that is, that in the perihelion and aphelion, they will be equal; and then the equation vanishes. This shews why the equation of a body moving in an elliptic orbit, is added to the mean or supposed circular motion from the perihelion to the aphelion, and subtracted from the aphelion to the perihelion, in bodies moving round the sun, or from the perigee to the apogee, and from the apogee to the perigee in the moon's motion round the earth.

This motion is performed in the following manner by the machine, (Plate LII. fig. 3.) ABC is a wooden bar, (in the box containing the wheel-work), above which are the wheels D and E, and below it the

elliptic plates FF and GG; each plate being fixed on an axis in one of its focuses, at E and K; and the wheel E is fixed on the same axis with the plate FF. These plates have grooves round their edges precisely of equal diameters to one another, and in these grooves is the cat-gut string *gg*, *gg* crossing between the plates at *b*. On H, the axis of the handle or winch N in fig. 2. is an endless screw in fig. 4. working in the wheels D and E, whose numbers of teeth being equal, and should be equal to the number of lines *aS*, *bS*, *cS*, &c. in fig. 2. they turn round their axes in as equal times to one another, and to the motion of the elliptic plates. For, the wheels D and E having equal numbers of teeth, the plate FF being fixed on the same axis with the wheel E, and the plate II turning the equally big plate GG by a cat-gut string round them both, they must all go round their axes in as many turns of the handle N as either of the wheels has teeth.

It is easy to see, that the end of *b* of the elliptical plate FF being farther from its axis E than the opposite end I is, must describe a circle so much the larger in proportion, and therefore move through so much more space in the same time; and for that reason the end *b* moves so much faster than the end I, although it goes no sooner round the centre E. But then the quick-moving end *b* of the plate FF leads about the short end *b*K of the plate GG with the same velocity; and the slow-moving end I of the plate FF coming half round as to B, must then lead the long end *k* of the plate GG as slowly about: so that the elliptical plate FF and its axis E move uniformly and equally quick in every part of its revolution; but the elliptical plate GG, together with its axis K, must move very unequally in different parts of its revolution; the difference being always inversely as the distance of any point of the circumference of GG from its axis at K: or in other words, to instance in two points, if the distance *Kk* be four, five, or six times as great as the distance *Kb*, the point *b* will move in that position four, five, or six times as fast as the point *k* does, when the plate GG has gone half round; and so on for any other excentricity or difference of the distances *Kk* and *Kb*. The tooth I on the plate FF falls in between the two teeth at *k* on the plate GG, by which means the revolution of the latter is so adjusted to that of the former, that they can never vary from one another.

On the top of the axis of the equally-moving wheel D in fig. 3. is the sun S in fig. 2.; which fun, by the wire fixed to it, carries the ball I round the circle ABCD, &c. with an equable motion, according to the order of the letters: and on the top of the axis K of the unequally-moving elliptic GG, in fig. 3. is the sun S in fig. 2. carrying the ball Y unequally round in the elliptical groove *abcd*, &c. N. B. This elliptical groove must be precisely equal and similar to the verge of the plate GG, which is also equal to that of FF.

In this manner machines may be made to shew the true motion of the moon about the earth, or of any planet about the sun, by making the elliptical plates of the same excentricities, in proportion to the radius, as the orbits of the planets are, whose motions they represent; and so their different equations in different parts of their orbits may be made plain to sight, and clearer ideas of these motions and equations acquired in half an hour, than could be gained from reading half

a day about such motions and equations.

THE IMPROVED CELESTIAL GLOBE, (Pl. XLVIII. fig. 2.) On the north pole of the axis, above the hour-circle, is fixed an arch MKH of $23\frac{1}{2}$ degrees; and at the end H is fixed an upright pin HG, which stands directly over the north pole of the ecliptic, and perpendicular to that part of the surface of the globe. On this pin are two moveable collets at D and I, to which are fixed the quadrantile wires N and O, having two little balls on their ends for the sun and moon, as in the figure. The collet D is fixed to the circular plate F, whereon the $29\frac{1}{2}$ days of the moon's age are engraven, beginning just under the sun's wire N; and as this wire is moved round the globe, the plate F turns round with it. These wires are easily turned, if the screw G be slackened: and when they are set to their proper places, the screw serves to fix them there so as in turning the ball of the globe, the wires with the sun and moon go round with it; and these two little balls rise and set at the same times, and on the same points of the horizon, for the day to which they are rectified, as the sun and moon do in the heavens.

Because the moon keeps not her course in the ecliptic, (as the sun appears to do), but has a declination of $5\frac{1}{2}$ degrees on each side from it in every lunation, her ball may be screwed as many degrees to either side of the ecliptic as her latitude or declination from the ecliptic amounts to at any given time; and for this purpose S, Plate LV. fig. 1. is a small piece of paste-board, of which the curved edge at S, is to be set upon the globe at right angles to the ecliptic, and the dark line over S to stand upright upon it. From this line, on the convex edge, are drawn the $5\frac{1}{2}$ degrees of the moon's latitude on both sides of the ecliptic; and when this piece is set upright on the globe, its graduated edge reaches to the moon on the wire O, by which means she is easily adjusted to her latitude found by an ephemeris.

The horizon is supported by two semicircular arches, because pillars would stop the progress of the balls when they go below the horizon in an oblique sphere.

To rectify this globe. Elevate the pole to the latitude of the place; then bring the sun's place in the ecliptic for the given day to the brazen meridian, and set the hour index to 12 at noon, that is to the upper 12 on the hour circle; keeping the globe in that situation, slacken the screw G, and let the fun directly over his place on the meridian; which done let the moon's wire under the number that expresses her age for that day on the plate F, and the will then stand over her place in the ecliptic, and shew what constellation she is in. Lastly, fasten the screw G, and laying the curved edge of the pasteboard S over the ecliptic below the moon, adjust the moon to her latitude over the graduated edge of the pasteboard; and the globe will be rectified.

Having thus rectified the globe, turn it round, and observe on what points of the horizon the sun and moon balls rise and set, for these agree with the points of the compass on which the sun and moon rise and set in the heavens on the given day: and the hour index shews the times of their rising and setting; and likewise the time of the moon's passing over the meridian.

This simple apparatus shews all the varieties that can happen in the rising and setting of the sun and moon: and makes the forementioned phenomena of

the harvest moon plain to the eye. It is also very useful in reading lectures on the globes, because a large company can see this sun and moon go round, rising above and setting below the horizon at different times according to the seasons of the year; and making their apulses to different fixed stars. But in the usual way, where there is only the places of the sun and moon in the ecliptic to keep the eye upon, they are easily lost sight of, unless they be covered with patches.

THE PLANETARY GLOBE, (Plate LIII. fig. 1.) In this machine, a terrestrial globe is fixed on its axis standing upright on the pedestal CDE, on which is an hour-circle, having its index fixed on the axis, which turns somewhat tightly in the pedestal, so that the globe may not be liable to shake; to prevent which, the pedestal is about two inches thick, and the axis goes quite through it, bearing on a shoulder. The globe is hung in a graduated brazen meridian, much in the usual way; and the thin plate N, NE, E is a moveable horizon graduated round the outer edge, for shewing the bearings and amplitudes of the sun, moon, and planets. The brazen meridian is grooved round the outer edge; and in this groove is a slender semicircle of brass, the ends of which are fixed to the horizon in its north and south points; this semicircle slides in the groove as the horizon is moved in rectifying it for different latitudes. To the middle of this semicircle is fixed a pin, which always keeps in the zenith of the horizon, and on this pin the quadrant of altitude *q* turns; the lower end of which, in all positions touches the horizon as it is moved round the same.

This quadrant is divided into 90 degrees from the horizon to the zenithal pin, on which it is turned, at 90. The great flat circle or plate AB is the ecliptic, on the outer edge of which the signs and degrees are laid down: and every fifth degree is drawn through the rest of the surface of this plate towards its centre. On this plate are seven grooves, to which seven little balls are adjusted by sliding wires, so that they are easily moved in the grooves, without danger of starting them. The ball next the terrestrial globe is the moon, the next without it is Mercury, the next Venus, the next the sun, then Mars, then Jupiter, and lastly Saturn. This plate or ecliptic, is supported by four strong wires, having their lower ends fixed into the pedestal, at C, D, E, the fourth being hid by the globe. The ecliptic is inclined $23\frac{1}{2}$ degrees to the pedestal, and is therefore properly inclined to the axis of the globe which stands upright on the pedestal.

To rectify this machine. Set the fun, and all the planetary balls, to their geocentric places in the ecliptic for any given time, by an ephemeris; then set the north point of the horizon to the latitude of your place on the brazen meridian, and the quadrant of altitude to the south point of the horizon; which done, turn the globe with its furniture till the quadrant of altitude comes right against the sun, viz. to his place in the ecliptic: and keeping it there, set the hour index to the XII next the letter C; and the machine will be rectified, not only for the following problems, but for several others which the artist may easily find out.

PROBLEM. I. *To find the amplitudes, meridian altitudes, and times of rising, culminating, and setting of the sun, moon, and planets.*

Turn the globe round eastward, or according to the order of signs; and as the eastern edge of the horizon comes right against the sun, moon, or any planet, the hour index will shew the time of its rising; and the inner edge of the ecliptic will cut its rising amplitude in the horizon. Turn on, and as the quadrant of altitude comes right against the sun, moon, or planets, the ecliptic cuts their meridian altitudes in the quadrant, and the hour index shews the times of their coming to the meridian. Continue turning, and as the western edge of the horizon comes right against the sun, moon, or planets, their setting amplitudes are cut in the horizon by the ecliptic; and the times of their setting are shewn by the index on the hour-circle.

- 322 **PROB. II.** *To find the altitude and azimuth of the sun, moon, and planets, at any time of their being above the horizon.*

Turn the globe till the index comes to the given time in the hour-circle, then keep the globe steady, and moving the quadrant of altitude to each planet respectively, the edge of the ecliptic will cut the planet's mean altitude on the quadrant, and the quadrant will cut the planet's azimuth, or point of bearing on the horizon.

- 323 **PROB. III.** *The sun's altitude being given at any time either before or after noon, to find the hour of the day, and variation of the compass, in any known latitude.*

With one hand hold the edge of the quadrant right against the sun; and with the other hand, turn the globe westward, if it be in the forenoon, or eastward if it be in the afternoon, until the sun's place at the inner edge of the ecliptic cuts the quadrant in the sun's observed altitude; and then the hour-index will point out the time of the day, and the quadrant will cut the true azimuth, or bearing of the sun for that time: the difference between which, and the bearing shewn by the azimuth compass, shews the variation of the compass in that place of the earth.

- 324 **THE TRAJECTORIUM LUNARE**, Plate LIII. fig. 2. This machine is for delineating the paths of the earth and moon, shewing what sort of curves they make in the ethereal regions. S is the sun, and E the earth, whose centres are 95 inches distant from each other; every inch answering to 1,000,000 of miles. M is the moon, whose centre is $\frac{2}{108}$ parts of an inch from the earth's in this machine, this being in just proportion to the moon's distance from the earth. A A is a bar of wood, to be moved by hand round the axis *g* which is fixed in the wheel Y. The circumference of this wheel is to the circumference of the small wheel L (below the other end of the bar) as $365\frac{1}{4}$ days is to $29\frac{1}{2}$, or as a year is to a lunation. The wheels are grooved round their edges, and in the grooves is the cat-gut string GG crossing between the wheels at X. On the axis of the wheel L is the index F, in which is fixed the moon's axis M for carrying her round the earth E (fixed on the axis of the wheel L) in the time that the index goes round a circle of $29\frac{1}{2}$ equal parts, which are the days of the moon's age. The wheel Y has the months and days of the year all round its limb; and in the bar A A is fixed the index I, which points out the days of the months answering to the days of

the moon's age, shewn by the index F, in the circle of $29\frac{1}{2}$ equal parts at the other end of the bar. On the axis of the wheel L is put the piece D, below the cock C, in which this axis turns round; and in D are put the pencils *e* and *m*, directly under the earth E and moon M; so that *m* is carried round *e*, as M is round E.

Lay the machine on an even floor, pressing gently on the wheel Y, to cause its spiked feet (of which two appear at P and P, the third being supposed to be hid from sight by the wheel) enter a little into the floor to secure the wheel from turning. Then lay a paper about four feet long under the pencils *e* and *m*, crosswise to the bar; which done, move the bar slowly round the axis *g* of the wheel Y; and as the earth E goes round the sun S, the moon M will go round the earth with a duly proportioned velocity; and the friction wheel W running on the floor, will keep the bar from bearing too heavily on the pencils *e* and *m*, which will delineate the paths of the earth and moon. As the index I points out the days of the months, the index F shews the moon's age on these days, in the circle of $29\frac{1}{2}$ equal parts. And as this last index points to the different days in its circle, the like numeral figures may be set to those parts of the curves of the earth's path and moon's, where the pencils *e* and *m* are at those times respectively, to shew the places of the earth and moon. If the pencil *e* be pushed a very little off, as if from the pencil *m*, to about $\frac{1}{10}$ part of their distance, and the pencil *m* pushed as much towards *e*, to bring them to the same distances again, though not to the same points of space; then, as *m* goes round *e*, *e* will go as it were round the centre of gravity between the earth *e* and moon *m*; but this motion will not sensibly alter the figure of the earth's path or the moon's.

If a pin, as *p*, be put through the pencil *m*, with its head towards that of the pin *q* in the pencil *e*, its head will always keep thereto as *m* goes round *e*, or as the same side of the moon is still obverted to the earth. But the pin *p*, which may be considered as an equatorial diameter of the moon, will turn quite round the point M, making all possible angles with the line of its progress, or line of the moon's path. This is an ocular proof of the moon's turning round her axis.

THE TIDE-DIAL, Plate LIV. fig. 1. The outside parts of this machine consist of, 1. An eight-sided box, on the top of which at the corners is shewn the phases of the moon at the octants, quarters, and full. Within these is a circle of $29\frac{1}{2}$ equal parts, which are the days of the moon's age accounted from the sun at new moon, round to the sun again. Within this circle is one of 24 hours divided into their respective halves and quarters. 2. A moving elliptical plate, painted blue, to represent the rising of the tides under and opposite to the moon; and has the words, *high water*, *tide falling*, *low water*, *tide rising*, marked upon it. To one end of this plate is fixed the moon M by the wire W, and goes along with it. 3. Above this elliptical plate is a round one, with the points of the compass upon it, and also the names of above 200 places in the large machine (but only 32 in the figure, to avoid confusion) set over those points in which the moon bears when she raises the tides to the greatest heights at these places twice in every lunar day: And to the north and south points of this plate are fixed two indexes

indexes I and K, which shew the times of high water, in the hour circle, at all these places. 4. Below the elliptical plate are four small plates, two of which project out from below its ends at new and full moon; and so, by lengthening the ellipse, shew the spring-tides, which are then raised to the greatest heights by the united attractions of the sun and moon. The other two of these small plates appear at low water when the moon is in her quadratures, or at the sides of the elliptical plate, to shew the neap-tides; the sun and moon then acting cross-wise to each other. When any two of these small plates appear, the other two are hid; and when the moon is in her octants, they all disappear, their being neither spring nor neap tides at those times. Within the box are a few wheels for performing these motions by the handle or winch H.

Turn the handle until the moon M comes to any given day of her age in the circle of $29\frac{1}{2}$ equal parts, and the moon's wire W will cut the time of her coming to the meridian on that day, in the hour circle; the XII under the sun being mid-day, and the opposite XII mid-night: Then looking for the name of any given place on the round plate (which makes $29\frac{1}{2}$ rotations whilst the moon M makes only one revolution from the sun to the sun again), turn the handle till that place comes to the word *high water* under the moon, and the index which falls among the forenoon hours will shew the time of high water at that place in the forenoon of the given day: then turn the plate half round, till the same place comes to the opposite high-water mark, and the index will shew the time of high water in the afternoon at that place. And thus, as all the different places come successively under and opposite to the moon, the indexes shew the times of high water at them in both parts of the day: and, when

the same places come to the low-water marks, the indexes shew the times of low water. For about three days before and after the times of new and full moon, the two small plates come out a little way from below the high-water marks on the elliptical plate, to shew that the tides rise still higher about these times: and about the quarters, the other two plates come out a little from under the low-water mark, towards the sun, and on the opposite side, shewing that the tides of flood rise not then so high, nor do the tides of ebb fall so low, as at other times.

By pulling the handle a little way outward, it is disengaged from the wheel-work, and then the upper plate may be turned round quickly by hand, so as the moon may be brought to any given day of her age in about a quarter of a minute; and by pushing in the handle, it takes hold of the wheel-work again.

On AB, (fig. 2.) the axis of the handle H, is an endless screw C, which turns the wheel FED of 24 teeth round in 24 revolutions of the handle: this wheel turns another ONG of 48 teeth, and on its axis is the pinion PQ of four leaves, which turns the wheel LKI of 59 teeth round in $29\frac{1}{2}$ turnings or rotations of the wheel FED, or in 708 revolutions of the handle, which is the number of hours in a synodical revolution of the moon. The round plate, with the names of places upon it, is fixed on the axis of the wheel FED; and the elliptical or tide-plate with the moon fixed to it, is upon the axis of the wheel LKI; consequently, the former makes $29\frac{1}{2}$ revolutions in the time that the latter makes one. The whole wheel FED, with the endless screw C, and dotted part of the axis of the handle AB, together with the dotted part of the wheel ONG, lie hid below the large wheel LKI.

A S T

ASTROP-WELLS, in Northamptonshire, were recommended by the physicians Willis and Clever, for the cure of the scurvy, althma, &c.

ASTROSCOPE, a kind of astronomical instrument, composed of two cones, on whose surface the constellations, with their stars, are delineated, by means whereof the stars may easily be known. The astroscope is the invention of William Schukhard, formerly professor of mathematics at Tubingen, who published a treatise expressly on it, in 1698.

ASTRUC (John), a celebrated physician, was born in the year 1684, at the little town of Savoy, in the province of Languedoc. His father, who was a protestant clergyman, bestowed particular pains upon the earliest part of his education. After which he went to the university of Montpellier, where he was created master of arts in the year 1700. He then began the study of medicine; and, in two years, obtained the degree of bachelor, having, upon that occasion, written a dissertation on the cause of fermentation, which he defended in a very spirited manner. On the 25th of January 1703, he was created doctor of physic; after which, before arriving at extensive practice, he applied to the study of medical authors, both ancient and modern, with uncommon assiduity. The good effects of his study soon appeared; for, in the year 1710, he published a treatise concerning muscular

A S T

motion, from which he acquired very high reputation. In the year 1717, he was appointed to teach medicine at Montpellier; which he did with such perspicuity and eloquence, that it was universally said, he had been born to be a professor. His fame soon rose to such a height, that the king assigned him an annual salary; and he was, at the same time, appointed to superintend the mineral waters in the province of Languedoc.

But, as Montpellier did not afford sufficient scope for his aspiring genius, he went to Paris with a great flock of manuscripts, which he intended to publish, after subjecting them to the examination of the learned. Soon after, however, he left it, having in the year 1729 accepted the office of first physician to the king of Poland, which was then offered to him. His stay in Poland, however, was but of short duration, and he again returned to Paris.

Upon the death of the celebrated Geoffroy, in the year 1731, he was appointed Regius Professor of medicine at Paris. The duties of this office he discharged in such a manner, as to answer even the most sanguine expectations. He taught the practice of physic with his great applause, as to draw from other universities to that of Paris, a great concourse of medical students, foreigners as well as natives of France. At the same time he was not more celebrated as a professor than a practitioner. And, even at an advanced age, he per-
fited

Fig. 1.



Fig. 2.

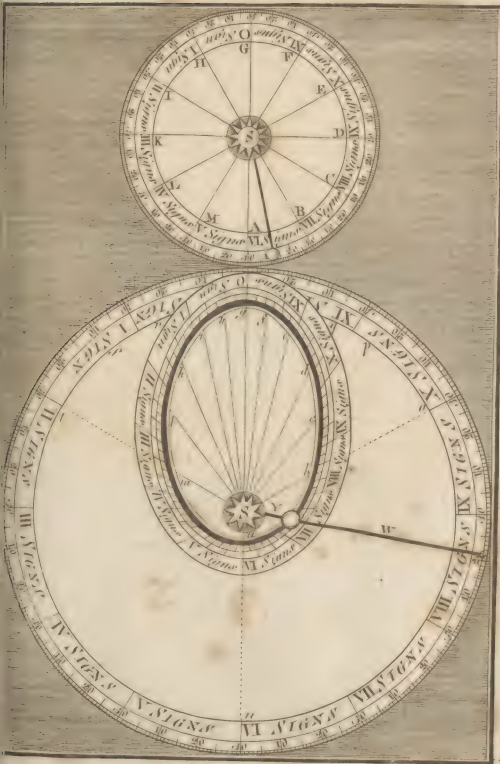


Fig. 3.

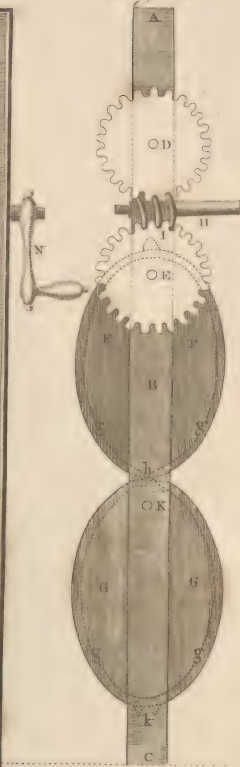




Fig. 2.

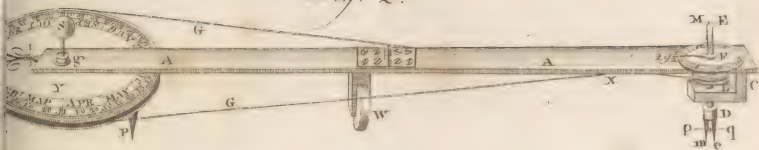


Fig. 1.

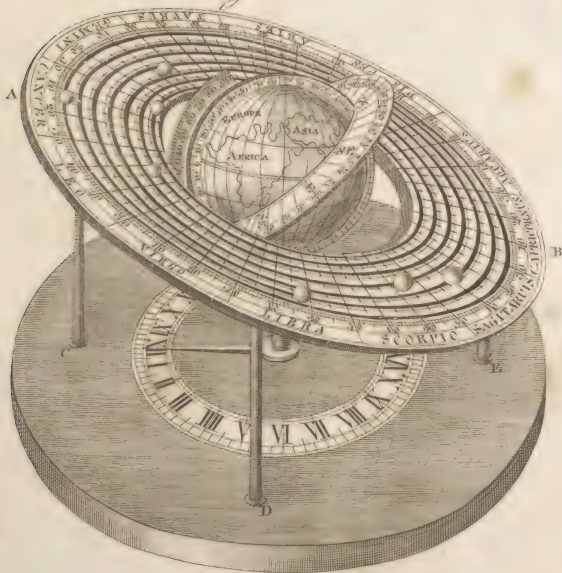
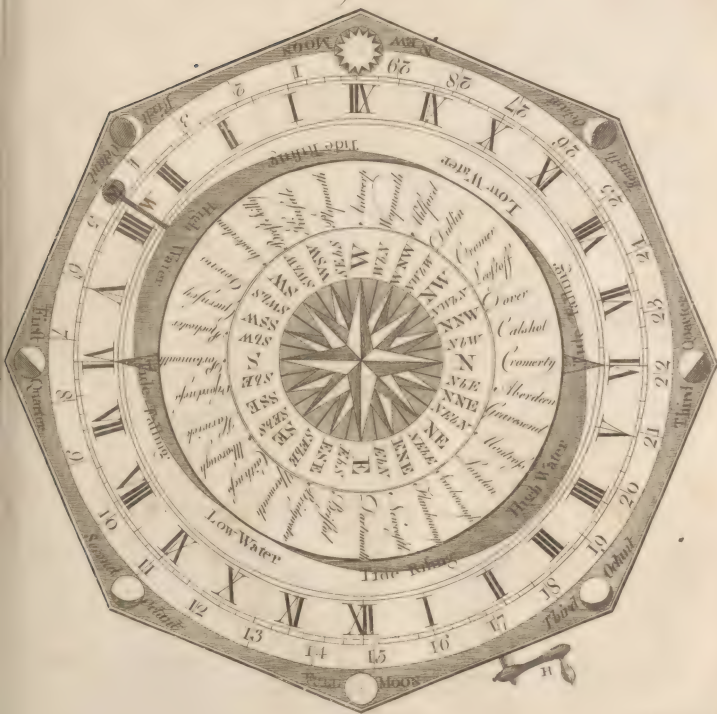






Fig. 1.





fitted with unwearied assiduity in that intense study which first raised his reputation. Hence it is, that he has been enabled to transmit to posterity so many valuable monuments of his medical erudition. He died, universally regretted, on the 15th of May, 1766, in the 82^d year of his age.

ASTURIA, an ancient kingdom of Spain, subdued by Augustus emperor of Rome.—The inhabitants of this country, along with those of Cantabria, asserted their liberty long after the rest of Spain had received the Roman yoke. So great was their desire of liberty, that, after being closely shut up by the Roman army, they endured the most terrible calamities of famine, even to the devouring of one another, rather than submit to the enemy. At length, however, the Asturians were for surrendering; but the Cantabrians opposed this measure, maintaining that they ought all to die sword in hand like brave men. Upon this the two nations quarrelled, notwithstanding their desperate situation; and a battle ensuing, 10,000 of the Asturians were driven to the intrenchments of the Romans, whom they begged in the most moving manner to receive them on any terms they pleased. But Tiberius the emperor's son-in-law refusing to admit them into the camp, some of these unhappy people put an end to their lives by falling upon their own swords; others lighting great fires threw themselves into them, while some poisoned themselves by drinking the juice of a venomous herb.

The campaign being put an end to by winter, the next year the Asturians summoned all their strength and resolution against the Romans; but, notwithstanding their utmost efforts of valour and despair, they were entirely defeated in a most bloody battle which lasted two days, and for that time entirely subdued. A few years afterwards they rebelled, in conjunction with the Cantabrians; but were soon reduced by the Romans, who massacred most of the young men that were capable of bearing arms. This did not prevent them from revolting anew in a short time afterwards; but without success, being obliged to submit to the Roman power, till the subversion of that empire by the Goths.

ASTURIAS, anciently the kingdom of Asturia, is now a principality of modern Spain, bounded by Biscay on the east, Galicia on the west, Castile and Old Leon on the south, and the sea on the north. Its greatest length is about 110 miles, and its breadth 54. On the south it is separated from Castile and Old Leon by high mountains covered with woods. The province is tolerably fertile; but thinly inhabited. The inhabitants value themselves much on being descended from the ancient Goths. Even the poor peasants, who are fain to go to seek work in other provinces, call themselves *illustrious Goths* and *Mountainers*, thinking it ignominious to marry even with great and rich families of another race. This pride is flattered by the respect paid them by the rest of the nation, and the privileges bestowed upon them by the government. The hereditary prince of Spain is stiled prince of the Asturias. The most remarkable places in this principality are Oviedo, Gyon, Santillana, and St Andero. See these articles.

ASTYAGES, son of Cyaxares, the last king of the Medes. He dreamed that from the womb of his daughter Mandane, married to Cambyzes king of Persia, there sprung a vine that spread itself over all Asia. She

being with child, he resolved to kill the infant as soon as born. Its name was Cyrus; and Harpagus, being sent to destroy it, preserved it: which Astyages after a long time hearing of, he caused Harpagus to eat his own son. Harpagus called in Cyrus, who dethroned his grandfather, and thereby ended the monarchy of the Medes. See **MEDIA** and **PERSIA**.

ASTYANAX, the only son of Hector and Andromache: after the taking of Troy, he was thrown from the top of a tower by Ulysses's orders.

ASTYNOMI, in Grecian antiquity, magistrates in Athens, corresponding to the ædiles of the Romans; they were ten in number. See **ÆDILE**.

ASYLUM, a sanctuary, or place of refuge, where criminals shelter themselves from the hands of justice. The asyls of altars and temples were very ancient; and likewise those of tombs, statues, and other monuments of considerable personages: Thus, the temple of Diana at Ephesus was a refuge for debtors, the tomb of Theseus for slaves. The Jews had their asyls; the most remarkable of which were, the six cities of refuge, the temple, and the altar of burnt-offerings.

ASYMMETRY, the want of proportion between the parts of any thing, being the contrary of symmetry.

ASYMPTOTE, in geometry, a line which continually approaches nearer to another; but, though continued infinitely, will never meet with it: Of these are many kinds. In strictness, however, the term *asymptotes* is appropriated to right lines, which approach nearer and nearer to some curves of which they are said to be *asymptotes*; but if they and their curve are indefinitely continued, they will never meet*.

ASYNDETON, in grammar, a figure which omits the conjunctions in a sentence; as in *veni, vidi, vici*, &c is left out. * See *Cong. Sections*.

ATABULUS, in physiology, a provincial wind in Apulia, of a dry pinching quality, and very noxious in its effects. The ancient naturalists speak of the Atabulus in terms of horror, on account of the ravage it made among the fruits of the earth, which it scorched or withered up.

ATABYRIS, a very high mountain in the island of Rhodes, on which, according to Strabo and Diodorus Siculus, there stood a temple of Jupiter Atabyrius, whose worship a colony of Rhodians carried into Sicily, where a temple was built to the same deity at Agrigentum.

ATARGATIS FANUM, the temple of a goddess worshipped by the Syrians and Parthians, having the face of a woman, and tail of a fish, and called *Derceto* by the Greeks. Her temple stood in the city Bambyce, called afterwards *Hierapolis*. It was extremely rich, inasmuch that Crassus, in his march against the Parthians, spent several days in weighing the treasure. Vossius makes the name of this goddess *Phœnician*, from *Addir-dag*, the great fish.

ATALANTA, an island in the Euripus of Eubœa, near the Locri Opuntii, said to have been originally a city of the Locri, but torn from the continent in the time of an earthquake, and during an eruption of mount Ætna. This happened in the fourth year of the 93^d Olympiad, in the reign of Artaxerxes Mneumon, (Pliny, Orosius).

ATALANTIS, **ATLANTICA**, or **ATLANTIS**. See **ATLANTIS**.

ATARAXY,

Astyanax
Atalantis.

Ataraxy
||
Atella.

ATARAXY, a term used by the stoics and sceptics, to denote that calmness of mind which secures us from all emotions arising from vanity and self-conceit.

ATARNEA, an ancient town of Mysia, situated between Adramyttium and Pitane, remarkable for the marriage of Aristotle with the sister or concubine of the tyrant Hermias; also for the dotage of that philosopher.

ATAXY, in a general sense, the want of order: With physicians, it signifies irregularity of crises and paroxysms of fevers.

ATCHE, in commerce, a small silver coin used in Turkey, and worth only one third of the English penny.

ATCIEVEMENT, in heraldry, denotes the arms of a person, or family, together with all the exterior ornaments of the shield; as helmet, mantle, crest, scrolls, and motto, together with such quarterings as may have been acquired by alliances, all marshalled in order.

ATCIEVE. This term is derived from the French *achever*, i. e. to finish or make an end of; but signifies, in heraldry, to perform great actions or exploits.

ATE, the goddess of mischief, in the Pagan theology. She was daughter of Jupiter, and cast down from heaven at the birth of Hercules. For Juno having deceived Jupiter, in causing Euristheus to be born before Hercules, Jupiter expressed his resentment on Ate, as the author of that mischief; and threw her headlong from heaven to earth, swearing she should never return thither again, (*Homeri Il. xix. 125.*) The name of this goddess comes from *ατρεω*, *nocere*, to hurt. Her being the daughter of Jupiter means, according to mythologists, that no evil happens to us but by the permission of providence; and her banishment to earth denotes the terrible effects of divine justice among men.

ATEGUA, or **ATTEGUA**, an ancient town of Spain, placed by some in the road from Antiquara, now Antequera, to Hispalis, or Seville; by others near Alcala Real; which last is the more probable situation, because the flumen salum, now the Salado, was in its neighbourhood. Now *Tebala Vieja*, or *Tevola*.

ATELLA, an ancient town of Campania in Italy, between Capua and Neapolis. From this town the *Atellana fabula*, or *Atellani ludi*, took their name. These were also called *Ofci*, from their inventor, in whose territory Atella lay. They were generally a species of farce, interlarded with much ribaldry and buffoonery; and sometimes were exordia or interludes presented between the acts of other plays. The actors in these farces were not reckoned among the common players, nor deemed infamous; but retained the rights of their tribe, and might be lifted for soldiers, the privilege only of free men. The ruins of this town are still to be seen about 11 miles from the modern Aversa, which was built out of its materials.

A TEMPO CIVISTO, in music, signifies to sing or play in an equal, true, and just time.

ATERNUM, a town of Lucania in Italy, now *Aterni*, (*Cluvenus*): Also a town in the territory of the Piceni, now *Pescara*, a port-town of Naples, situated on the Adriatic. E. Long. 15. 25. N. Lat. 42. 30.

ATESTE, a town in the territory of Venice in Italy, now called *Este*. E. Long. 12. 6. N. Lat. 45. 25.

ATHAMADULET, the prime minister of the Persian empire, as the grand vizier is of the Turkish empire. He is great chancellor of the kingdom, president of the council, superintendent of the finances, and is charged with all foreign affairs.

ATHAMANTA, **SPIGNEL**; a genus of the dymnia order, belonging to the pentandria class of plants. Of this genus Linnaeus enumerates nine species; but none of them merit particular notice except the cretensis, otherwise called *daucus creticus*. This is an umbelliferous plant growing wild in the Levant and the warmer parts of Europe. The leaves are irregularly disposed, and formed like those of fennel. The flower-stalk rises about two feet high, sending out many branches, terminated at the top by compound umbels, composed of near 20 small ones. These have white flowers with five petals, which are succeeded by oblong, hairy, channelled fruit, divided into two parts, containing one oblong hairy seed. The seeds have a warm biting taste, with an agreeable aromatic smell. They are kept in the shops as a medicine, are carminative, and said to be diuretic; but are little used in practice. The plant may be propagated from seeds, which should be sown on an open bed of light dry ground; the following autumn the plants should be taken up, and planted at about a foot distance in a bed of light sandy earth, where the roots will continue several years.

ATHANASIA, **GOLDLOCKS**; a genus of the polygamia aequalis order, belonging to the syngenesia class of plants. Of this genus, Dr Linnaeus mentions 11

Species; of which the following six are by Mr Miller reckoned worthy of a place in those gardens where there are conveniences for preserving tender plants, as none of these species will outlive the winters of this country. 1. The *dentata* grows naturally at the Cape of Good Hope. It rises three or four feet high, sending out many side-branches, garnished with pretty long narrow leaves, having some resemblance to those of buckthorn plantain. The branches are generally terminated by yellow flowers formed into a kind of umbel. These flowers appear early in summer, and the seeds ripen in autumn. 2. The *trifurcata* is also a native of Africa, as are the three following sorts. It is a shrubby plant, about the height of the former, sending out several weak shoots, garnished with awl-shaped trifid leaves set close to them, of a pale silvery colour. The flowers are yellow, and terminate the branches in a corymbus. They appear in August, and the seeds ripen in October. 3. The *crithmifolia* rises with a strong shrubby stalk to the height of six or eight feet, sending out many ligneous branches garnished with long narrow leaves terminating in four or five parts like those of samphire. The flowers are like those of the former, and appear in July and August, being succeeded by seeds which ripen in October. 4. The *pubescens* hath strong woody stalks four or five feet high, covered with a woolly bark, as are also the branches, which are closely garnished with entire, spear-shaped, woolly leaves, and are terminated by yellow flowers having a long foot-stalk, and are sometimes succeeded by seeds that ripen in the autumn. 5. The *annua* is a low annual plant, seldom rising above a foot high, and sending forth two or three slender branches garnished with wing-pointed leaves: the stalks are terminated

Atham
le
Atham

minated by bright yellow flowers growing in umbels, which appear in August and September; but unless the season is very favourable, the seeds do not ripen in this country. 6. The maritima, or sea cudweed, grows naturally on the coasts of the Mediterranean, as also in Wales, and some other parts of Britain; notwithstanding which, Mr Miller says it must be put under a glass-frame in winter, and rarely perfects good seeds in Britain. It rises two or three feet high, sending out a few weak branches, garnished with white spear-shaped leaves terminated by a single flower upon each foot-stalk. The first four of these sorts may be propagated either by seeds or cuttings; and their culture is not materially different from that of the common hot-bed plants.

ATHANASIAN CREED; a formulary, or confession of faith, long supposed to have been drawn up by Athanasius bishop of Alexandria, in the fourth century, to justify himself against the calumnies of his Arian enemies. But it is now generally allowed among the learned not to have been his. Dr Waterland ascribes it to Hilary bishop of Arles, for the following among other reasons: 1. Because Honoratus of Marcellis, the writer of his life, tells us, that he composed an *Exposition of the Creed*; a proper title for the *Athanasian*, than that of *Creed* simply which it now bears. 2. Hilary was a great admirer and follower of St Austin; and the whole composition of this creed is in a manner upon St Austin's plan, both with respect to the trinity and incarnation. 3. It is agreeable to the style of Hilary, as far as we can judge from the little that is left of his works. Upon the whole, he concludes, that Hilary bishop of Arles, about the year 430, composed the *The Exposition of Faith*, which now bears the name of the *Athanasian Creed*, for the use of the Gallican clergy, and particularly those of the diocese of Arles: That, about the year 570, it became famous enough to be commented upon; but that, all this while, and for several years lower, it had not yet acquired the name of *Athanasian*, but was simply styled *The Catholic Faith*: That, before 670, Athanasius's admired name came in to recommend and adorn it, being in itself an excellent system of the Athanasian principles of the trinity and incarnation, in opposition chiefly to the Arians, Macedonians, and Apollinarians. This is the hypothesis of the learned author of the *Critical History of the Athanasian Creed*.

As to the reception of this creed in the Christian churches, we find, that it obtained in France in the time of Hincmar, or about 850; that it was received in Spain about 100 years later than in France, and in Germany much about the same time. As to our own country, we have clear and positive proofs of this creed being sung alternately in our churches in the tenth century. It was in common use in some parts of Italy, particularly in the diocese of Verona, about the year 960, and was received at Rome about the year 1014. As to the Greek and oriental churches, it has been questioned, whether any of them ever received this creed at all; tho' some very considerable writers are of a contrary persuasion. It appears then, that the reception of this creed has been both general and ancient; and may vie with any, in that respect, except the Nicene, or Constantinopolitan, the only general creed common to all the churches.

As to the matter of this creed, it is given as a summary of the true orthodox faith, and a condemnation of all heresies ancient and modern. Unhappily, however, it has proved a fruitful source of unprofitable controversy and unchristian animosity even down to the present time.

ATHANASIUS (St), bishop of Alexandria, and one of the greatest defenders of the faith against the Arians, was born in Egypt. He followed St Alexander to the council of Nice, in 325, where he disputed against Arius, and the following year was made bishop of Alexandria; but, in 335, was deposed by the council of Tyre: when, having recourse to the emperor Constantine, the Arian deputies accused him of having hindered the exportation of corn from Alexandria to Constantinople; on which the emperor, without suffering him to make his defence, banished him to Treves. The emperor, two years after, gave orders that he should be restored to his bishopric: but, on his return to Alexandria, his enemies brought fresh accusations against him, and chose Gregory of Cappadocia to his see; which obliged Athanasius to go to Rome to reclaim it of pope Julius. He was there declared innocent, in a council held in 342, and in that of Sardica in 347, and two years after was restored to his see by order of the emperor Constant; but after the death of that prince, he was again banished by the emperor Constantius, which obliged him to retire into the deserts. The Arians then elected one George in his room; who being killed in a popular sedition under Julian, in 360, St Athanasius returned to Alexandria, but was again banished under Julian, and restored to his see under Jovian. He addressed to that emperor a letter, in which he proposed that the Nicene creed should be the standard of the orthodox faith, and condemned those who denied the divinity of the Holy Ghost. He was also banished by Valens in 367, and afterwards recalled. St Athanasius died on the 2^d of May, 373.

His works principally contain a defence of the mystery of the Trinity, and of the incarnation and divinity of the Word and Holy Spirit. There are three editions of his works which are esteemed; that of Commelin, printed in 1600; that of Peter Nannius, in 1627; and that of father Montfaucon. As to the creed which bears his name, see the preceding article.

ATHANATI, in Persian antiquity, a body of cavalry, consisting of 10,000 men, always complete. They were called *athanati*, (a word originally Greek, and signifying *immortal*), because, when one of them happened to die, another was immediately appointed to succeed him.

ATHANOR. Chemists have distinguished by this name a furnace so constructed that it can always maintain an equal heat, and which shall last a long time without addition of fresh fuel.

The body of the athanor has nothing in it particular, and is constructed like ordinary furnaces. But at one of its sides, or its middle, there is an upright hollow tower, which communicates with the fire-place by one or more sloping openings. This tower ought to have a lid which exactly closes its upper opening.

When the athanor is to be used, as much lighted coal is put in the fire-place as is judged necessary, and the tower is filled to the top with unlighted fuel. The

Athor
Atheling.

tower is then to be exactly closed with its lid. As fast as the coal in the fire-place is consumed, that in the tower falls down and supplies its place. As the coal contained in the tower has no free communication with the external air, it cannot burn till it falls into the fire-place.

The athor being much celebrated and used by ancient chemists, it has been particularly described by many authors, and was formerly found in all laboratories. At present this furnace is much less employed, and is even neglected. The reason of this is, that all the ancient chemists were in search of the art of making gold; and being excited by this powerful desire, and confidence of success, they spared no trouble nor expense to accomplish this design. They undertook, without hesitation, operations which required great length of time and unremitted heat. Whereas now, these alluring hopes having vanished, the cultivators of chemistry have no other view than to extend and perfect the theory of this essential part of natural philosophy. This motive, altho' undoubtedly much nobler than the former, seems however to be less powerful over most men. For now, all long and laborious operations whence chemistry might receive great advantages, are neglected, as being tiresome and disgusting. There is, in fact, a considerable difference betwixt the hope of explaining a philosophical phenomenon, and that of obtaining an ingot of gold capable of producing many others. Hence the instruments employed in long operations, and particularly the athor, are now much neglected; and also because the fuel in the tower is apt to stick there or fall down at once in too great quantity. The lamp-furnace, which is a true athor, may be successfully employed in operations which do not require much heat*.

* See Chemistry, n° 98, a.

ATHEISM, the disbelief of a deity. See ATHEIST.

ATHEIST, a person who does not believe the existence of a Deity. Many people, both ancient and modern, have pretended to atheism, or have been reckoned atheists by the world; but it is justly questioned whether any man seriously adopted such a principle. These pretensions, therefore, must be founded on pride or affectation.

Atheism, as absurd and unreasonable as it is, has had its martyrs. Lucilio Vanini, an Italian, native of Naples, publicly taught atheism in France, about the beginning of the seventeenth century; and, being convicted of it at Toulouse, was condemned to death. Being pressed to make public acknowledgement of his crime, and to ask pardon of God, the king, and justice, he answered, he did not believe there was a God; that he never offended the king; and, as for justice, he wished it to the devil. He confessed that he was one of twelve, who parted in company from Naples, to spread their doctrine in all parts of Europe. His tongue was first cut out, and then his body burnt, April 9. 1619.

ATHELING, ADELING, EDLING, ETHLING, or ETHELING, among the Anglo-Saxons, was a title of honour properly belonging to the heir apparent, or presumptive, to the crown. This honourable appellation was first conferred by king Edward the Confessor on Edgar, to whom he was great uncle, when, being without any issue of his own, he intended to make him his heir.

Athelstan
Athens.

ATHELSTAN, a Saxon king of England, natural son of Edward the elder, and grandson of the great Alfred. He succeeded to the crown in 925, and reigned 16 years. There was a remarkable law passed by this prince, which shews his just sentiments of the advantages of commerce, as well as the early attention to it in this country: it declared, that any merchant who made three voyages on his own account beyond the British channel or narrow seas, should be entitled to the privileges of a thane, or gentleman.

ATHENÆA, in antiquity, a feast celebrated by the ancient Greeks in honour of Minerva, who was called *Athene*.

ATHENÆUM, in antiquity, a public place where, in the professors of the liberal arts held their assemblies, the rhetoricians declaimed, and the poets rehearsed their performances. These places, of which there were a great number at Athens, were built in the manner of amphitheatres, encompassed with seats, called *cunei*. The three most-celebrated Athenæa were those at Athens, at Rome, and at Lyons, the second of which was built by the emperor Adrian.

ATHENÆUS, a physician, born in Cilicia, cotemporary with Pliny, and founder of the pneumatic sect. He taught that the fire, air, water, and earth, are not the true elements, but that their qualities are, *viz.* heat, cold, moisture, and dryness; and to these he added a fifth element, which he called *spirit*, whence his sect had its name.

ATHENÆUS, a Greek grammarian, born at Naucratis in Egypt in the 3^d century, one of the most learned men of his time. Of all his works we have none extant but his *Deipnosophias*, i. e. the sophsists at table; there is an infinity of facts and quotations in this work which render it very agreeable to admirers of antiquity.

There was also a mathematician of this name, who wrote a treatise on mechanics, which is inserted in the works of the ancient mathematicians, printed at Paris in 1693, in folio, in Greek and Latin.

ATHENAGORAS, an Athenian philosopher, flourished about the middle of the 2^d century; and was remarkable for his zeal for Christianity, and his great learning, as appears from the apology which he addressed to the emperors Marcus Aurelius Antoninus and Lucius Commodus.

ATHENODORUS, a famous stoic philosopher, born at Tarsus, went to the court of Augustus, and was made by him tutor to Tiberius. Augustus had a great esteem for him, and found him by experience a man of virtue and probity. He used to speak very freely to the emperor. He, before he left the court to return home, warned the emperor not to give himself up to anger, but, whenever he should be in a passion, to rehearse the 24 letters of the alphabet before he resolved to say or do any thing. He did not live to see his bad success in the education of Tiberius.

ATHENOPOLIS, a town of the Massiliens, an ancient nation of Gaul. It is conjectured by Harduin to be the same with *Telo Martius*, now *Toulon*; by others to be the same with *Antipolis* or *Antibes*.

ATHENREE, a town of Ireland in the county of Galway, and province of Connaught. W. Long. 8. 5. N. Lat. 53. 14.

ATHENS, a celebrated city of Greece, and capital

Athens.

tal of the ancient kingdom of Attica, situated in E. Long. 53. N. Lat. 38. 5. See *ATTICA*.

In early times, that which was afterwards called the *citadel* was the whole city; and went under the name of *Cecropia*, from its founder Cecrops, whom the Athenians in after times affirmed to have been the first builder of cities, and called this therefore by way of eminence *Polis*, i. e. the city. In the reign of Erichthonius it lost the name of *Cecropia*, and acquired that of *Athens*, on what account is not certain; the most probable is, that it was so named in respect to the goddess Minerva, whom the Greeks call *Athene*, who was also esteemed its protectress. This old city was seated on the top of a rock in the midst of a large and pleasant plain, which, as the number of inhabitants increased, became full of buildings, which induced the distinction of Acro and Catapolis, i. e. of the upper and lower city. The extent of the citadel was 60 stadia; it was surrounded by olive trees, and fortified, as some say, with a strong palisade; in succeeding times it was encompassed with a strong wall, in which there were nine gates, one very large one, and the rest small. The inside of the citadel was adorned with innumerable edifices. The most remarkable of which were, 1. The magnificent temple of Minerva, styled *parthenion*, because that goddess was a virgin. The Persians destroyed it; but it was rebuilt with still greater splendour, by the famous Pericles, all of the finest marble, with such skill and strength, that, in spite of the rage of time and barbarous nations, it remains perhaps the first antiquity in the world, and stands a witness to the truth of what ancient writers have recorded of the prodigious magnificence of Athens in her flourishing state. 2. The temple of Neptune and of Minerva; for it was divided into two parts: one sacred to the god, in which was the salt fountain said to have sprung upon the stroke of his trident; the other to the goddess protectress of Athens, wherein was the sacred olive which she produced, and her image which fell down from heaven in the reign of Erichthonius. At the back of Minerva's temple was the public treasury, which was burnt to the ground through the knavery of the treasurers, who, having misapplied the revenues of the state, took this short method of making up accounts. The lower city comprehended all the buildings surrounding the citadel, the fort Munychia, and the havens Phalerum and Piræus, the latter of which was joined to the city by walls five miles in length; that on the north was built by Pericles, but that on the south by Themistocles; but by degrees the turrets which were at first erected on these walls were turned into dwelling-houses for the accommodation of the Athenians, whose large city was now become too small for them. The city, or rather the lower city, had 13 great gates, with the names of which it is not necessary to trouble the reader. Among the principal edifices which adorned it, we may reckon, 1. The temple of Theseus, erected by Conon, near its centre. Adjacent thereto, the young people performed their exercises. It was also a sanctuary for distressed persons, slaves or free. 2. The Olympian temple erected in honour of Jupiter, the honour of Athens, and of all Greece. The foundation of it was laid by Pisistratus: it was carried on but slowly in succeeding times, 700 years elapsing before it was finished, which happened under the reign

of Adrian, who was particularly kind to Athens: this was the first building in which the Athenians beheld pillars. 3. The pantheon, dedicated to all the gods; a most noble structure, supported by 120 marble pillars, and having over its great gate two horses carved by Praxiteles: it is yet remaining, as we shall have occasion to shew hereafter when we come to speak of the present state of this famous city. In several parts of it were *staoi* or portico's, wherein people walked in rainy weather, and from whence a sect of philosophers were denominated stoics, because their master Zeno taught in those portico's.

There were at Athens two places called *Ceramicus*, from Ceramus the son of Bacchus and Ariadne; one within the city, containing a multitude of buildings of all sorts; the other in the suburbs, in which was the academy, and other edifices. The Gymnasia of Athens were many; but the most remarkable were the Lyceum, Academia, and Cynosarges. The Lyceum stood on the banks of Ilissus; some say it was built by Pisistratus, others by Pericles, others by Lycurgus. Here Aristotle taught philosophy, instructing such as came to hear him as they walked, whence his disciples are generally thought to derive the name of peripatetics. The ceramicus without the city was the distance of six stadia from its walls. The academy made part thereof; as to the name of which there is some dispute. Some affirm that it was so called from Academus, an ancient hero, who, when Helen was stolen by Theseus, discovered the place where she lay hid, to Castor and Pollux: for which reason the Lacedæmonians, when they invaded Attica, always spared this place. Dicaearchus writes, that Castor and Pollux had two Arcadians in their army, the one named *Echademus*, the other *Marathus*; from the former of these he says this place took its name, and that the borough of Marathon was so called from the other. It was a marshy unwholesome place, till Cimon was at great pains to have it drained; and then it became extremely pleasant and delightful, being adorned with shady walks, where Plato read his lectures, and from thence his scholars were styled *academics*. The Cynosarges was a place in the suburbs not far from the Lyceum: it was famous on many accounts; but particularly for a noble gymnasium erected there, appointed for the special use of such as were Athenians only by one side. In after times Themistocles derived to himself ill-will, by carrying many of the nobility to exercise with him here, because, being but of the half blood, he could exercise no where else but in this gymnasium. Antisthenes instituted a sect of philosophers, who from the name of this district, as many think, were styled *Cynics*.

The havens of Athens were three. First the Pyræus, which was distant about 35 or 40 stadia from the city, till joined thereto by the long walls beforementioned, after which it became the principal harbour of the city. It had three docks; Cantharos, Aphrodisium, and Zea: the first was so called from an ancient hero, the second from the goddess Venus who had there two temples, and the third from bread-corn. There were in this port five portico's, which joining together formed one great one called from thence *Macra Stoa*, or the grand portico. There were likewise two great markets or fora; one near the long portico, the other near the city. The second port was Munichia, a promontory

Athens.

Ceramicus,

Cynosarges,

Havens.

not far distant from Pyræus; a place very strong by nature, and afterwards rendered far stronger by art. It was of this that Epimenides said, if the Athenians forefaw what mischief it would one day produce to them, they would eat it away with their teeth. The third was Phalerum, distant from the city, according to Thucydides, 35 stadia, but according to Pausanias only 20. This was the most ancient harbour of Athens, as Pyræus was the most capacious.

6
Present
state.

Of this city, as it stands at present, we have the following account by Dr Chandler. "It is now called *Athini*; and is not inconsiderable, either in extent or the number of inhabitants. It enjoys a fine temperature, and a serene sky. The air is clear and wholesome, though not so delicately soft as in Ionia. The town stands beneath the Acropolis or citadel; not encompassing the rock, as formerly; but spreading into the plain, chiefly on the west and north-west. Corfairs infesting it, the avenues were secured, and in 1676 the gates were regularly shut after sunset. It is now open again; but several of the gateways remain, and a guard of Turks patrols at midnight. Some masses of brick-work, standing separate, without the town, belonged perhaps to the ancient wall, of which other traces also appear. The houses are mostly mean, and straggling; many with large areas or courts before them. In the lanes, the high walls on each side, which are commonly white-washed, reflect strongly the heat of the sun. The streets are very irregular; and anciently were neither uniform nor handsome. They have water conveyed in channels from mount Hymettus, and in the bazar or market-place is a large fountain. The Turks have several mosques and public baths. The Greeks have convents for men and women; with many churches, in which service is regularly performed; and besides these, they have numerous oratories or chapels, some in ruins or consisting of bare walls, frequented only on the anniversaries of the saints to whom they are dedicated. A portrait of the owner on a board is placed in them on that occasion, and removed when the solemnity of the day is over.

7.
Citadel, or
city of Ce-
crops.

"The city of Cecrops is now a fortress with a thick irregular wall, standing on the brink of precipices, and inclosing a large area about twice as long as broad. Some portions of the ancient wall may be discovered on the outside, particularly at the two extreme angles; and in many places it is patched with pieces of columns, and with marbles taken from the ruins. A considerable sum had been recently expended on the side next Hymettus, which was finished before we arrived. The scaffolding had been removed to the end toward Pentee; but money was wanting, and the workmen were withdrawn. The garrison consists of a few Turks, who reside there with their families, and are called by the Greeks *Gastriani*, or the soldiers of the castle. The rock is lofty, abrupt, and inaccessible, except the front, which is toward the Piræus; and on that quarter is a mountainous ridge, within cannon-shot. It is destitute of water fit for drinking; and supplies are daily carried up in earthen jars, on horses and asses, from one of the conduits in the town.

"The acropolis furnished a very ample field to the ancient virtuosi. It was filled with monuments of Athenian glory, and exhibited an amazing display of beauty, of opulence, and of art; each contending, as it

was, for the superiority. It appeared as one entire offering to the Deity, surpassing in excellence, and astonishing in richness. Heliodorus, named *Periegetes the guide*, had employed on it 15 books. The curiosities of various kinds, with the pictures, statues, and pieces of sculpture, were so many and so remarkable, as to supply Pölemo Periegetes with matter for four volumes; and Strabo affirms, that as many would be required in treating of other portions of Athens and of Attica. In particular, the number of statues was prodigious. Tiberius Nero, who was fond of images, plundered the acropolis, as well as Delphi and Olympia; yet Athens, and each of these places, had not fewer than 3000 remaining in the time of Pliny. Even Pausanias seems here to be distressed by the multiplicity of his subject. But this banquet, as it were, of the senses has long been withdrawn; and is now become like the tale of a vision. The spectator views with concern the marble ruins intermixed with mean flat-roofed cottages, and extant amid rubbish; the sad memorials of a nobler people; which, however, as visible from the sea, should have introduced modern Athens to more early notice. They who reported it was only a small village, must, it has been surmised, have beheld the acropolis through the wrong end of their telescopes.

"The acropolis has now, as formerly, only one entrance, which fronts the Piræus. The ascent is by traverses and rude fortifications furnished with cannon, but without carriages, and neglected. By the second gate is the station of the guard, who sits cross-legged under cover, much at his ease, smoking his pipe, or drinking coffee, with his companions about him in like attitudes. Over this gateway is an inscription in large characters on a stone turned upside down, and black from the fires made below. It records a present of a pair of gates.

"Going farther up, you come to the ruins of the propylæa, an edifice which graced the entrance into the citadel. This was one of the structures of Pericles, who began it when Euthymenes was archon, 435 years before Christ. It was completed in five years, at the expense of 2012 talents. It was of marble, of the Doric order, and had five doors to afford an easy passage to the multitudes which resorted on business or devotion to the acropolis.

"While this fabric was building, the architect Mnesicles, whose activity equalled his skill, was hurt by a fall, and the physicians despaired of his life; but Minerva, who was propitious to the undertaking, appeared, it was said, to Pericles, and prescribed a remedy, by which he was speedily and easily cured. It was a plant or herb growing round about the acropolis, and called afterwards *parthenium*.

"The right wing of the propylæa was a temple of Victory. They related that Ægeus had stood there, viewing the sea, and anxious for the return of his son Theseus, who was gone to Crete with the tributary children to be delivered to the Minotaur. The vessel which carried them had black sails suiting the occasion of its voyage; and it was agreed, that, if Theseus overcame the enemy, their colour should be changed to white. The neglect of this signal was fatal to Ægeus, who, on seeing the sails unaltered, threw himself down headlong from the rock, and perished. The idol was named

8
Propylæa.

9
Temple of
Victory.

Athen. named *Victory without wings*; it was said, because the news of the success of Theseus did not arrive, but with the conqueror. It had a pomegranate in the right hand, and an helmet in the left. As the statue was without pinions, it was hoped the goddess would remain for ever on the spot.

"On the left wing of the propylæa, and fronting the temple of Victory, was a building decorated with paintings by Polygnotus, of which an account is given by Pausanias. This edifice, as well as the temple, was of the Doric order, the columns fluted, and without bases. Both contributed alike to the uniformity and grandeur of the design; and the whole fabric, when finished, was deemed equally magnificent and ornamental. The interval between Pericles and Pausanias consists of several centuries. The propylæa remained entire in the time of this topographer, and, as will be shown, continued nearly so to a much later period. It had then a roof of white marble, which was unsurpassed either in the size of the stones, or in the beauty of their arrangement; and before each wing was an equestrian statue.

"The propylæa have ceased to be the entrance of the acropolis. The passage, which was between the columns in the centre, is walled up almost to their capitals, and above is a battery of cannon. The way now winds before the front of the ancient structure; and, turning to the left hand among rubbish and mean walls, you come to the back part, and to the five doorways. The soil without is risen higher than the top of the two smaller. There, under the vault and cannon, lies an heap of large stones, the ruin of the roof.

"The temple of Victory, standing on an abrupt rock, has its back and one side unencumbered with the modern ramparts. The columns in the front being walled up, you enter it by a breach in the side, within the propylæa. It was used by the Turks as a magazine for powder, until about the year 1656; when a sudden explosion, occasioned by lightning, carried away the roof, with a house erected on it, belonging to the officer who commanded in the acropolis, whose family, except a girl, perished. The women of the Aga continued to inhabit in this quarter, but it is now abandoned and in ruins.

"The cell of the temple of Victory, which is of white marble, very thick, and strongly cemented, sufficiently witnesses the great violence it has undergone; the stones in many places being disjointed, as it were, and forced from their original position. Two of these making an acute angle, the exterior edges touching, without a crevice; and the light abroad being much stronger than in the room, which has a modern roof and is dark; the portion in contact becoming pellucid, had illumined the vacant space with a dim colour resembling that of amber. We were desirous to examine this extraordinary appearance, which the Greeks regarded as a standing miracle, and which the Turks, who could not confute them, beheld with equal astonishment. We found in the gape some coals, which had been brought on a bit of earthen ware for the purpose of burning incense, as we supposed, and also a piece of wax-taper, which probably had been lighted in honour of the faint and author of the wonder; but our Swiss unfortunately carrying his own candle too far in, the smoke blackened the marble, and de-

froyed the phenomenon.

"The building opposite to the temple has served as a foundation for a square lofty tower of ordinary masonry. The columns of the front are walled up, and the entrance is by a low iron gate in the side. It is now used as a place of confinement for delinquents; but in 1676 was a powder-magazine. In the wall of a rampart near it are some fragments of exquisite sculpture, representing the Athenians fighting with the Amazons. These belong to the frieze, which was then standing. In the second century, when Pausanias lived, much of the painting was impaired by age, but some remained, and the subjects were chiefly taken from the Trojan story. The traces are since vanished.

"The pediment of the temple of Victory, with that of the opposite wing, is described as remaining in 1676; but on each building, a square tower had been erected. One of the steps in the front of the propylæa was entire, with the four columns, their entablature and the pediment. The portico, to which the five doorways belonged, consisted of a large square room, roofed with slabs of marble, which were laid on two great marble beams, and sustained by four beautiful columns. These were Ionic, the proportions of this order best suiting that purpose, as taller than the Doric; the reason it was likewise preferred in the pronaos of the temple of Victory. The roof of the propylæa, after standing above 2000 years, was probably destroyed, with all the pediments, by the Venetians in 1687, when they battered the castle in front, firing red-hot bullets, and took it, but were compelled to resign it again to the Turks in the following year. The exterior walls, and, in particular, a side of the temple of Victory, retain many marks of their hostilities.

"The chief ornament of the acropolis was the parthenon or great temple of Minerva, a most superb and magnificent fabric. The Persians had burned the edifice, which before occupied the site, and was called *hecatompedon*, from its being 100 feet square. The zeal of Pericles and of all the Athenians was exerted in providing a far more ample and glorious residence for their favourite goddess. The architects were Callicrates and Ictinus; and a treatise on the building was written by the latter and Carion. It was of white marble, of the Doric order, the columns fluted and without bases, the number in front eight; and adorned with admirable sculpture. The story of the birth of Minerva was carved in the front pediment; and in the back, her contest with Neptune for the country. The beasts of burden, which had conveyed up the materials, were regarded as sacred, and recompensed with pastures; and one, which had voluntarily headed the train, was maintained during life, without labour, at the public expence.

"The statue of Minerva, made for this temple by Phidias, was of ivory, 26 cubits or 39 feet high. It was decked with pure gold to the amount of 44 talents, so disposed by the advice of Pericles as to be taken off and weighed, if required. The goddess was represented standing, with her vestment reaching to her feet. Her helmet had a sphinx for the crest, and on the sides were griffins. The head of Medusa was on her breast-plate. In one hand she held her spear, and in the other supported an image of Victory about four cubits high. The battle of the Centaurs and

Athen.

Temple of Minerva.

Her statue.

Lapithæ

Roof carried off by an explosion.

Athens.

Lapithæ was carved on her sandals; and on her shield, which lay at her feet, the war of the gods and giants, and the battle of the Athenians and Amazons. By her spear was a serpent, in allusion to the story of Erichthonius; and on the pedestal, the birth of Pandora. The Sphinx, the Victory, and Serpent, were accounted eminently wonderful. This image was placed in the temple in the first year of the 87th Olympiad, in which the Peloponnesian war began. The gold was stripped off by the tyrant Lachares, when Demetrius Poliorcetes compelled him to fly. The same plunderer polished down the golden shields in the acropolis, and carried away the golden Victories, with the precious vessels and ornaments provided for the Panathenæan festival.

"The parthenon remained entire for many ages after it was deprived of the goddess. The Christians converted it into a church, and the Mahometans into a mosque. It is mentioned in the letters of Crustius, and mis-called the *pantheon*, and the temple of the *unknown God*. The Venetians under Koningmark, when they besieged the acropolis in 1687, threw a bomb, which demolished the roof, and setting fire to some powder, did much damage to the fabric. The floor, which is indented, still witnesses the place of its fall. This was the sad forerunner of farther destruction; the Turks breaking the stones, and applying them to the building of a new mosque, which stands within the ruin, or to the repairing of their houses and the walls of the fortrefs. The vast pile of ponderous materials, which lay ready, is greatly diminished; and the whole structure will gradually be consumed and disappear.

x3
Temple converted
into a
mosque.

The temple of Minerva in 1676 was, as Wheeler and Spon assert, the finest mosque in the world, without comparison. The Greeks had adapted the fabric to their ceremonial by constructing at one end a semicircular recess for the holy tables, with a window: for before it was enlightened only by the door, obscurity being preferred under the heathen ritual, except on festivals, when it yielded to splendid illuminations; the reason, it has been surmised, why temples are commonly found simple and unadorned on the insides. In the wall beneath the window were inserted two pieces of the stone called *phengites*, a species of marble discovered in Cappadocia in the time of Nero; and so transparent, that he erected with it a temple to Fortune, which was luminous within, when the door was shut. These pieces were perforated, and the light which entered was tinged with a reddish or yellowish hue. The picture of the Panagia or Virgin Mary, in Mosaic, on the ceiling of the recess, remained; with two jasper columns belonging to the *ikreen*, which had separated that part from the nave; and within, a canopy supported by four pillars of porphyry, with Corinthian capitals of white marble, under which the table had been placed; and behind it, beneath the window, a marble chair for the archbishop; and also a pulpit, standing on four small pillars in the middle aisle. The Turks had white-washed the walls, to obliterate the portraits of saints, and the other paintings, with which the Greeks decorate their places of worship; and had erected a pulpit on the right hand for their iman or reader. The roof was disposed in square compartments; the stones massive; and some had fal-

len in. It had been sustained in the pronaos by six columns; but the place of one was then supplied by a large pile of rude masonry, the Turks not having been able to fill up the gap more worthily. The roof of the naos was supported by colonnades ranging with the door, and on each side; consisting of 22 pillars below, and of 23 above. The odd one was over the entrance, which by that disposition was left wide and unembarrassed. In the portico were suspended a few lamps, to be used in the mosque at the seasons when the muselmans assemble before day-break, or to be lighted up round the minaret, as is the custom during their Ramadan or Lent.

"It is not easy to conceive a more striking object than the parthenon, though now a mere ruin. The columns within the naos have all been removed: but on the floor may be seen the circles which directed the workmen in placing them; and at the farther end is a groove across it, as for one of the partitions of the cell. The recess erected by the Christians is demolished; and from the rubbish of the ceiling the Turkish boys collect bits of the Mosaic, of different colours, which composed the picture. We were told at Smyrna, that this substance had taken a polish, and been set in buckles. This cell is about half demolished; and in the columns, which surrounded it, is a large gap near the middle. On the walls are some traces of the paintings. Before the portico is a reservoir sunk in the rock, to supply the Turks with water for the purifications customary on entering their mosques. In it, on the left-hand, is the rubbish of the pile erected to supply the place of a column; and on the right, a staircase, which leads out on the architrave, and has a marble or two with inscriptions, but worn so as not to be legible. It belonged to the minaret, which has been destroyed.

"The travellers, to whom we are indebted for an account of the mosque, have likewise given a description of the sculpture then remaining in the front. In the middle of the pediment was seen a bearded Jupiter, with a majestic countenance, standing, and naked; the right arm broken. The thunder-bolt, it has been supposed, was placed in that hand, and the eagle between his feet. On his right was a figure, it is conjectured, of Victory, clothed to the mid-leg; the head and arms gone. This was leading on the horses of a car, in which Minerva sat, young and unarmed; her head-dress, instead of a helmet, resembling that of a Venus. The generous ardour and lively spirit visible in this pair of celestial steeds, was such as bespoke the hand of a master, bold and delicate, of a Phidias or Praxiteles. Behind Minerva was a female figure, without a head, sitting, with an infant in her lap; and in this angle of the pediment was the emperor Hadrian with his arm round Sabina, both reclining, and seeming to regard Minerva with pleasure. On the left side of Jupiter were five or six other trunks to complete the assembly of deities, into which he received her. These figures were all wonderfully carved, and appeared as big as life. Hadrian and his consort, it is likely, were complimented by the Athenians with places among the marble gods in the pediment, as benefactors. Both of them may be considered as intruders on the original company; and possibly their heads were placed on trunks, which before had other owners. They

Athe.

14.
Magnificent
ruin.

15.
Sculpture.

Athens.

still possess their corner, and are easy to be recognized, though not unimpaired. The rest of the statues are defaced, removed, or fallen. Morosini was ambitious to enrich Venice with the spoils of Athens; and by an attempt to take down the principal group, hastened their ruin. In the other pediment is a head or two of sea-horses finely executed, with some mutilated figures; and on the architrave beneath them are marks of the fixtures of votive offerings, perhaps of the golden shields, or of festoons suspended on solemn occasions, when the temple was dressed out to receive the votaries of the goddess.

16 Erechtheum.

“ Neptune and Minerva, once rival deities, were joint and amicable tenants of the Erechtheum, in which was an altar of Oblivion. The building was double, a partition-wall dividing it into two temples, which fronted different ways. One was the temple of Neptune Erechtheum, the other of Minerva Polias. The latter was entered by a square portico connected with a marble screen, which fronts towards the propylæa. The door of the cell was on the left hand; and at the farther end of the passage was a door leading down into the Pandroseum, which was contiguous.

27 temple of Neptune Erechtheus.

“ Before the temple of Neptune Erechtheus was an altar of Jupiter *the supreme*, on which no living thing was sacrificed, but they offered cakes without wine. Within it was the altar of Neptune and Erechtheus; and two, belonging to Vulcan and a hero named *Buteus*, who had transmitted the priesthood to his posterity, which were called *Butade*. On the walls were paintings of this illustrious family, from which the priestesses of Minerva Polias was also taken. It was asserted that Neptune had ordained the well of salt water, and the figure of a trident in the rock, to be memorials of his contending for the country. The former, Pausanias remarks, was no great wonder, for other wells of a similar nature were found inland; but this, when the fourth wind blew, afforded the sound of waves.

29 Minerva Polias.

“ The temple of Minerva Polias was dedicated by all Attica, and possessed the most ancient statue of the goddess. The demi or towns had other deities, but their zeal for her suffered no diminution. The image, which they placed in the acropolis, then the city, was in after ages not only reputed consummately holy, but believed to have fallen down from heaven in the reign of Erichonius. It was guarded by a large serpent, which was regularly served with offerings of honied cakes for his food. This divine reptile was of great sagacity, and attained to an extraordinary age. He wisely withdrew from the temple, when in danger from the Medes; and, it is said, was living in the second century. Before this statue was an owl; and a golden lamp. This continued burning day and night. It was contrived by a curious artist, named *Callimachus*, and did not require to be replenished with oil oftener than once a-year. A brazen palm-tree, reaching to the roof, received its smoke. Aristion had let the holy flame expire while Sylla besieged him, and was abhorred for his impiety. The original olive-tree, said to have been produced by Minerva, was kept in this temple. When the Medes set fire to the acropolis, it was consumed; but, they asserted, on the following day, was found to have shot up again as much as a cubit. It grew low and crooked, but was esteemed very holy. The priestesses of Minerva was not allowed

Athens.

to eat of the new sheaf of Attica; and, among her perquisites, was a measure of wheat, and one of barley, for every birth and burial. This temple was again burned when Callias was archon, 24 years after the death of Pericles. Near it was the tomb of Cecrops, and within it Erechtheus was buried.

“ The ruin of the Erechtheum is of white marble; the architectural ornaments of very exquisite workmanship, and uncommonly curious. The columns of the front of the temple of Neptune are standing with the architrave; and also the screen and portico of Minerva Polias, with a portion of the cell retaining traces of the partition-wall. The order is Ionic. An edifice revered by ancient Attica, as holy in the highest degree, was in 1676 the dwelling of a Turkish family, and is now deserted and neglected; but many ponderous stones and much rubbish must be removed before the well and trident would appear. The former, at least, might probably be discovered. The portico is used as a powder-magazine; but we obtained permission to dig and to examine the outside. The door-way of the vestibule is walled up, and the soil risen nearly to the top of the door-way of the Pandroseum. By the portico is a battery commanding the town, from which ascends an amusing hum. The Turks fire from it, to give notice of the commencement of Ramazan or of their Lent, and of bairam or the holy-days, and on other public occasions.

“ The Pandroseum is a small, but very particular building, of which no satisfactory idea can be communicated by description. The entablature is supported by women called *Caryatides*. Their story is thus related. The Greeks, victorious in the Persian war, jointly destroyed Carya, a city of the Peloponnesus, which had favoured the common enemy. They cut off the males, and carried into captivity the women, whom they compelled to retain their former dress and ornaments, though in a state of servitude. The architects of those times, to perpetuate the memory of their punishment, represented them, as in this instance, each with a burden on her head, one hand uplifted to it, and the other hanging down by her side. The images were in number six, all looking toward the parthenon. The four in front, with that next to the propylæa, remain, but mutilated, and their faces be-freighted with paint. The soil is risen almost to the top of the basement on which they are placed. This temple was open or latticed between the statues; and in it also was a stunted olive-tree, with an altar of Jupiter Herceus standing under it. The propylæa are nearly in a line with the space dividing it from the parthenon; which disposition, besides its other effects, occasioned the front and flank of the latter edifice to be seen at once by those who approached it from the entrance of the acropolis.

“ The ruin of the temple of Jupiter Olympius consists of prodigious columns, tall and beautiful, of the Corinthian order, fluted; some single, some supporting their architraves; with a few massive marbles beneath; the remnant of a vast heap, which only many ages could have consumed and reduced into so scanty a compass. The columns are of very extraordinary dimensions, being about six feet in diameter, and near sixty in height. The number without the cell was 160 or 120. Seventeen were standing in 1676; but a few years before we arrived,

29 Of Jupiter Olympius.

ved,

Athens.

ved, one was overturned with much difficulty, and applied to the building a new mosque in the bazar or marketplace. This violence was avenged by the bashaw of Negropont, who made it a pretext for extorting from the valvade or governor 15 purfes; the pillar being, he alleged, the property of their master the Grand Signior. It was an angular column, and of consequence in determining the dimensions of the fabric. We regretted that the fall of this mighty mass had not been postponed until we came, as it would have afforded an opportunity of inspecting and measuring some members which we found far too lofty to be attempted. On a piece of the architrave, supported by a couple of columns, are two parallel walls, of modern masonry, arched about the middle, and again near the top. You are told it has been the habitation of a hermit, doublets of a Stylites; but of whatever building it has been part, and for whatever purpose designed, it must have been erected thus high in air, while the immense ruin of this huge structure was yet scarcely diminished, and the heap inclined so as to render it accessible. It was remarked that two stones of a step in the front had coalesced at the extremity, so that no juncture could be perceived; and the like was discovered also in a step of the parthenon. In both instances it may be attributed to a concretory fluid, which pervades the marble in the quarry. Some portion remaining in the pieces, when taken green as it were, and placed in mutual contact, it excluded and united them by a process similar to that in a bone of an animal when broken and properly set.

20
Detached
pieces of an-
tique sculp-
ture, &c.

“ Besides the more stable antiquities, many detached pieces are found in the town, by the fountains, in the streets, the walls, the houses, and churches. Among these are fragments of sculpture; a marble chair or two, which probably belonged to the Gymnasia or theatres; a fun-dial at the catholicon or cathedral, inscribed with the name of the maker; and, at the archiepiscopal house close by, a very curious vessel of marble, used as a cistern to receive water, but once serving, it is likely, as a public standard or measure. Many columns occur; with some maimed statues; and pedestals, several with inscriptions, and almost buried in earth. A custom has prevailed, as at Chios, of fixing in the wall, over the gateways and doors of the houses, carved stones, most of which exhibit the funeral supper. In the courts of the houses lie many round stones, or pillars, once placed on the graves of the Athenians; and a great number are still to be seen applied to the same use in the Turkish burying grounds before the acropolis. These generally have concise inscriptions containing the name of the person, and of the town and tribe, to which the deceased belonged. Demetrius the Phalerean, who endeavoured to restrain sepulchral luxury, enacted, that no person should have more than one, and that the height should not exceed three cubits. Another species, which resembles our modern head-stones, is sometimes adorned with sculpture, and has an epitaph in verse. We saw a few mutilated Hermæ. These were built on long quadrangular bases, the heads frequently of brass, invented by the Athenians. At first they were made to represent only Hermes or Mercury, and designed as guardians of the sepulchres in which they were lodged; but afterwards the houses, streets, and

porticoes of Athens, were adorned with them, and rendered venerable by a multitude of portraits of illustrious men and women, of heroes and of gods: and, it is related, Hipparchus, son of Pisistratus, erected them in the demi or borough-towns, and by the road side, inscribed with moral apophthegms in elegiac verse; thus making them vehicles of instruction.”

ATHERINA, in ichthyology, a genus of fishes of the order of abdominales. The characters of this genus are these: The upper jaw is plain: the rays of the branchiosteege membrane are six; and the side-belt or line shines like silver. The species are two, viz. 1. The hepsetus, with about 12 rays in the fin next the anus. It is found in the Mediterranean. It is also very common in the sea near Southampton, where it is called a *finelt*. The highest season is from March to the latter end of May, or beginning of June; in which month it spawns. It never deserts the place; and is constantly taken except in hard frost. It is also found on other coasts of our island. The length is above four inches $\frac{1}{2}$, and the tail is much forked. The fish is semipellucid, covered with scales; the colour silvery, tinged with yellow: beneath the side-line is a row of small black spots. 2. The menidea, with 24 rays in the fin next the anus. This is a very small pellucid fish, with many black points interperfed; it has many teeth in the lips, but none in the tongue or jaws. It is found in the fresh waters of Carolina, and spawns in April.

ATHEROMA, in surgery, a tumour without pain or discoloration of the skin, containing, in a membranous bag, matter resembling pap, intermixed with hard and stony particles. These tumours are easily cured by incision.

ATHERTON, or ATHERSTON, a town of Warwickshire in England, situated on the river Stour, in W. Long. 1. 30. N. Lat. 52. 40. It is a considerable town, and had formerly a monastery; but now is best known by its fair, which is the greatest in England for cheese.

ATHLETÆ, in antiquity, persons of strength and agility, disciplined to perform in the public games. The word is originally Greek, ἀθλητής; formed from ἀθλας, certamen, combat; whence also ἀθλον, the prize or reward adjudged the victor. Under athlete were comprehended wrestlers, boxers, runners, leapers, throwers of the disk, and those practised in other exercises exhibited in the Olympic, Pythian, and other solemn sports; for the conquerors wherein there were established prizes.

ATHLETIC HABIT, denotes a strong hale constitution of body. Anciently it signified a full fleshy corpulent state, such as the athlete endeavoured to arrive at. The athletic habit is esteemed the healthiest pitch of health: yet is it dangerous, and the next door to disease; since, when the body is no longer capable of being improved, the next alteration must be for the worse. The chief object of the athletic diet, was to obtain a firm, bulky, weighty body; by force of which, more than art and agility, they frequently overpowered their antagonist: hence they fed altogether on dry, solid, and viscous meats. In the earlier days, their chief food was dry figs, and cheese, which was called *arida saginatio*, ἄριστα σάγιον, and Ἀκραιστὸν διαίτην ἰσχυρόν. Oribasius, or, as others say, Pythagoras, first brought this

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Athlone
||
Athos.

this in difuse, and substituted flesh in lieu thereof. They had a peculiar bread called *καλαμαρι*: They exercised, eat, and drank, without ceasing: they were not allowed to leave off eating when fatigued, but were obliged to cram on till they could hold no more; by which means they at length acquired a degree of voracity which to us seems incredible, and a strength proportional. Witness what Pausanias relates of the four celebrated athletes, Polydamas the Thessalian, Milo the Crotonian, Theagenes the Thasian, and Euthymus the Locrian*: The second is said to have carried a bull on his back a considerable way, then to have knocked him down with a blow of his fist, and lastly, as some add, devoured him at a meal.

* Don. Dict.
Antiq.

ATHLONE, a town of Westmeath in Ireland, situated on the river Shannon, in W. Long. 8. o. N. Lat. 53. 20. It is pretty large, and divided into two parts by the river, over which there is a stone bridge. Both divisions are well fortified, but it was taken by king William in 1691. Below this town the country is low, flat, and marshy; and on the bank of the Shannon there is a great bog, the soil of which is good for nothing but to make turf. This bog extends 50 miles in length, and in some places is two or three miles broad.

ATHOL, the most northern district of Perthshire in Scotland, extending in length forty-three miles, and in breadth thirty. It is bordered on the north by Badenoch, on the west by Lochaber, on the east and south-east by Mar and Gowrie, on the south by Strathern and Perth Proper, and on the south-west by Braidalbane. The country is very rough and mountainous, and contains part of the ancient Caledonian forest, but these mountains are interperfed with fruitful valleys. Here are several villages, but no towns of any consideration. The most noted place is Blair Castle, seated on the river Tilt, near its influx into the Gurry, a pleasant limpid stream, that falls into the Tay. This castle belongs to the duke of Athol, who derives his title from this district, and lives here with great magnificence. In the same neighbourhood we see the paps of Gillicranky, rendered memorable by the battle fought here in the beginning of king William's reign, between that monarch's general McKay, and the Highlanders adhering to king James. See GILLICRANKY.

ATHOS, a celebrated mountain of Chalcidia in Macedonia, situated E. Long. 26. 20. N. Lat. 40. 10. The ancients entertained extravagant notions concerning its height. Mela affirmed it to be so high as to reach above the clouds; and Martianus Capellinus, that it was six miles high. It was a received opinion, that the summit of mount Athos was above the middle region of the air, and that it never rained there; because the ashes left on the altars erected near its summit were always found as they were left, dry and unscattered. But if on many accounts it was famous among the ancients, it is no less so among the moderns. The Greeks, struck with its singular situation and the venerable appearance of its towering ascent, erected so many churches, monasteries, hermitages, &c. upon it, that it became in a manner inhabited by devotees, and from thence received the name of the *Holy Mountain*; which name it still retains, though many of those consecrated works are now decayed. According to the accounts of modern travellers, this mountain advances into the Archipelago, being joined to the continent by

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an isthmus about half a league in breadth. It is about 30 miles in circumference, and two in perpendicular height. It may be travelled over in about three days, and may be seen 90 miles off. There is a fine prospect from the top; but, like all other high mountains, the cold on its summit is excessive. It abounds with many different kinds of plants and trees, particularly the pine and fir. In the valleys grows a plant called *elgia*, whose branches serve to make pens for writing. In short, this mountain is said to be adorned with variety of herbage and evergreens, a multitude of springs and streams, and woods growing near the shore, so as to be one of the most agreeable places in the world.

It is now inhabited by Caloyers, a sort of Greek monks, of the order of St Basil, who never marry; though others of that church do. They abstain from flesh, and fare very hardly, their ordinary meal being olives pickled when they are ripe. They are about 6000 in all, and inhabit several parts of the mountain, on which are 24 large old monasteries, surrounded with high walls for a defence against banditti. They are so respected, that the Turks themselves will often send them alms. These monks are not idle like others; but labour with the ax, spade, and sickle, dressing themselves like hermits. Formerly they had fine Greek manuscripts; but are now become so illiterate, that they can scarce read or write.

Through this mountain, or rather through the isthmus behind it, Xerxes king of Persia is said to have cut a passage for his fleet when about to invade Greece. In this work he spent three whole years, and employed in it all the forces on board the fleet. He is also said, before the work was begun, to have written the following insolent and ridiculous letter to the mountain: "Athos, thou proud and aspiring mountain, that liftest up thy head to the very skies, I advise thee not to be so audacious as to put rocks and stones, that cannot be cut, in the way of my workmen. If thou makest that opposition, I will cut thee entirely down, and throw thee headlong into the sea." The directors of this enterprise are said to have been Bubaris the son of Megabyzus, and Artacheus the son of Arbeus, both Persians; but as no traces of such a great work remain, the truth of the whole relation has justly been called in question.

ATHY, a town of Ireland in the county of Kildare, not far from the borders of Queen's county. W. Long. 7. o. N. Lat. 53. o.

ATIGNY, an ancient town of Champagne in France, where several of the kings of France had their residence. It is seated on the river Arne, in E. Long. 4. 47. N. Lat. 49. 30.

ATKINS (Sir Robert), lord chief baron of the exchequer, was born in 1621, and educated at the university of Oxford, from whence he removed to the inns of court, and became eminent in the law. He was made knight of the Bath, with many other persons of the first distinction, at the coronation of king Charles II. In 1672, he was appointed one of the judges of Common Pleas; in which honourable station he continued till 1679, when, foreseeing the troubles that soon after ensued, he thought fit to resign, and retire into the country. In 1689, he was made by king William lord chief baron of the exchequer; and about the same time executed the office of speaker to

Athos
||
Atkins.

Atkins
||
Atlantis.

the house of lords, which had been previously refused by the marquis of Halifax. He distinguished himself by an unshaken zeal for the laws and liberties of his country. He wrote several pieces, which have been collected into one volume 8vo, under the title of *Parliamentary and Political Tracts*. The authors of the *Biographia Britannica* remark, that whoever inclines to be thoroughly informed of the true constitution of his country, of the grounds and reasons of the revolution, and of the danger of suffering prerogative to jostle law, cannot read a better or plainer book than those tracts of Sir Robert Atkins. He died in 1709, aged 88.

ATKINS (Sir Robert), son of the preceding, was born in 1646, and was eminent for all the virtues that could adorn an English gentleman. He wrote the ancient and present state of Gloucestershire, in one large volume in folio; and died October 29, 1711.

ATKINS (Richard), was descended from a good family, and was born at Tuffleigh, in Gloucestershire, in the year 1615. He was educated at Oxford, from whence he removed to Lincoln's Inn, and afterwards distinguished himself by his loyalty to king Charles I. for whom he raised a troop of horse at his own expense. At the Restoration he was made one of the deputy lieutenants of Gloucestershire, and distinguished himself by his attachment to the government. But at length being committed prisoner to the Marshalsea in Southwark for debt, he died there on the 14th of September 1677. He wrote several pieces, particularly a treatise on the original and growth of Printing.

ATLANTIC OCEAN, that bounded by Europe and Africa on the east, and by America on the west.

ATLANTICA. See ATLANTIS.

ATLANTIDES, in astronomy, a denomination given to the Pleiades, or seven stars, sometimes also called *Vergilias*. They are thus called, as being supposed by the poets to have been the daughters either of Atlas, or his brother Hesperus, who were translated into heaven.

ATLANTIS, ATALANTIS, or ATLANTICA, an island mentioned by Plato, and some others of the ancients, concerning the real existence of which many disputes have been raised. Homer, Horace, and the other poets, make two Atlanticas, calling them *Hesperides*, and *Elysian fields*, making them the habitations of the blessed. The most distinct account of this island we have in Plato's *Timæus*, of which Mr Chambers gives the following abridgement. "The Atlantis was a large island in the western ocean, situated before or opposite to the straits of Gades. Out of this island there was an easy passage into some others, which lay near a large continent exceeding in bigness all Europe and Asia. Neptune settled in this island (from whose son Atlas its name was derived), and divided it among his sons. To the youngest fell the extremity of the island called *Gadir*, which, in the language of the country, signifies *fertile*, or *abundant in sheep*. The descendants of Neptune reigned here from father to son for a great number of generations in the order of primogeniture, during the space of 9000 years. They also possessed several other islands; and, passing into Europe and Africa, subdued all Libya as far as Egypt, and all Europe to Asia Minor. At length the island sunk under

water; and for a long time afterwards the sea thereabouts was full of rocks and shelves."

Many of the moderns, also, are of opinion that the existence of the Atlantis is not to be looked upon as entirely fabulous. Some take it to have been America; and from thence, as well as from a passage in Seneca's *Medea*, and some other obscure hints*, they imagine that the new world was not unknown to the ancients. But allowing this to be the case, the above-mentioned continent which was said to lie beyond Atlantis would seem rather to have been the continent of America than Atlantis itself. The learned Rudbeck, professor in the university of Upsal, in a work entitled *Atlantica five Manheim*, endeavours to prove that Sweden and Norway are the Atlantis of the ancients; but this its situation will by no means allow us to believe. By Kircher it is supposed to have been an island extending from the Canaries quite to the Azores; that it was really swallowed up by the ocean as Plato asserts; and that these small islands are the shattered remains of it which were left standing.

ATLAS, king of Mauritania, a great astronomer, contemporary with Moses. From his taking observations of the stars from a mountain, the poets feigned him to have been turned into a mountain, and to sustain the heavens on his shoulders. Being an excellent astronomer, and the first who taught the doctrine of the sphere, they tell us that his daughters were turned into stars; seven of them forming the Pleiades, and other seven the Hyades.

ATLAS, a chain of mountains in Africa, lying between the 20th and 25th degree of north latitude, and supposed almost to divide the continent from east to west*. They are said to have derived their name from Atlas king of Mauritania, who was a great astronomer. They are greatly celebrated by the ancients on account of their height, inasmuch that the above-mentioned king, who is said to have been transformed into a mountain, was feigned to bear up the heavens on his shoulders. We are assured, however, by Dr Shaw, that the part of this chain of mountains which fell under his observation, could not stand in competition either with the Alps or Apennines. He tells us, that if we conceive a number of hills, usually of the perpendicular height of 400, 500, or 600 yards, with an easy ascent, and several groves of fruit or forest trees, rising up in a succession of ranges above one another; and that if to this prospect we add now and then a rocky precipice, and on the summit of each imagine a miserable mud-walled village; we shall then have a just idea of the mountains of Atlas.

ATLAS, in matters of literature, denotes a book of universal geography, containing maps of all the known parts of the world.

ATLAS, in commerce, a silk-fatin, manufactured in the East Indies. There are some plain, some striped, and some flowered, the flowers of which are either gold or only silk. There are atlases of all colours; but most of them false, especially the red and the crimson. The manufacture of them is admirable; the gold and silk being worked together after such a manner as no workmen in Europe can imitate; yet they are very far from having that fine gloss and lustre which the French know how to give to their silk stuffs. In the Chinese manufactures of this sort, they gild paper on

Atla

* See Africa, n^o.

* See Africa.

Atmo-
sphere.

one side with leaf-gold; then cut it in long slips, and weave it into their silks; which makes them, with very little cost, look very rich and fine. The same long slips are twisted or turned about silk-threads, so artificially, as to look finer than gold thread, though it be of no great value.

ATMOSPHERE, is most generally understood to signify the whole extent of air diffused around this earth, the sun, moon, or any other great body in the universe.

Component
parts of our
atmosphere.

With regard to the component parts of the air we breathe, Dr Priestley hath by undoubted experiments proved them to be the nitrous acid, earth, and phlogiston. To these we may certainly add water, of which the substances he made use of in producing air could never be perfectly free; and as the Doctor inclines to think that the electric fluid may be the phlogiston itself, we will thus have the subtle fluid of electricity as a capital ingredient in the composition of the atmosphere of the earth.

Indeed, whether this fluid is admitted by the Doctor or not as an ingredient in the air he distills, we are absolutely certain that it enters in no small quantity into the composition of the air we breathe. It is also certain, that the higher up we go in the atmospherical regions, the quantity of electrical fluid is apparently greater; neither hath any means been as yet suggested, by which we can determine where this electrical power begins to diminish, much less where it ceases altogether. Hence some have imagined, that though the atmosphere of the earth, as consisting of an heterogeneous mixture of a great number of fluids, extends but for a little way, yet that the electrical part of it may extend to the moon, or farther, and be the cause of the revolutions of that luminary; and that a similar affection of the solar atmosphere may occasion the revolutions of planets and comets.*

See Atmo-
sphere, no 93.
102.The first-rate
geometricians
of the
height.

The first-rate geometricians of modern times have been very solicitous to find out the height of the atmosphere; but the high degree of electricity always existing in the upper parts of it being but very lately, and even yet imperfectly, discovered, it was necessarily overlooked by them, so that their calculations were made without any regard to it, or without suspecting the existence of any such things. The first attempts that were made with this view were soon after the weight of the atmosphere was found out. It having been discovered, that a column of air whose base was an inch square, and the height of it that of the whole atmosphere, weighed 15 lb, and that the weight of air was to Mercury as 1 to 10,800, it thence followed, that if the weight of the atmosphere was sufficient to raise a column of Mercury to the height of 30 inches, the height of the aerial column itself behaved to be 20,800 times as much, or a little more than five miles high. But as the air hath also a very great elastic power, by which it expands itself when the pressure of the rest is taken off from any part of it, it is impossible the foregoing calculation can be just. Another method therefore behaved to be followed. It being found by repeated experiments in different countries, that the spaces which any portion of air takes up are reciprocally proportional to the weights with which it is compressed, allowances for the gradual decrease of weight behaved to be made in calculating the height of the

atmosphere. If we suppose the height of the whole atmosphere divided into innumerable equal parts, the density of each of which is as its quantity, and the weight of the whole incumbent atmosphere being also as its quantity, it is evident, that the weight of the incumbent air is every where as the quantity contained in the subjacent part; which makes a difference between the weight of each two contiguous parts of air. By a theorem in geometry, where the differences of magnitudes are geometrically proportional to the magnitudes themselves, those magnitudes are in continual arithmetical proportion; therefore, if, according to the supposition, the altitude of the air by the addition of new parts into which it is divided, do continually increase in arithmetical proportion, its density will be diminished, or, which is the same thing, its gravity decreased, in continual geometrical proportion.

Atmo-
sphere.

From such a series it is easy, by making two or three barometrical observations, and determining the rarity of the air at two or three different stations, to determine its rarity at any assignable height. Calculations accordingly were made upon this plan; but it having been found that the barometrical observations by no means corresponded with the density which by other experiments the air ought to have had, it was suspected that the upper parts of the atmospherical regions were not subject to the same laws with the lower ones. Another method therefore was had recourse to, namely, by calculating the height from which the light of the sun was refracted so as to become visible to us before the sun himself arose. Thus, it was determined, that at the height of 45 miles the atmosphere had no power of refracting light; and therefore, that, if it extended beyond that distance, it behaved to be the next thing to a perfect vacuum, and not to be regarded.

Found in-
sufficient.Another
method.

This theory being extremely plausible, very soon became general; and the height of the atmosphere was commonly spoken of as familiarly as the height of a mountain, and reckoned to be as certainly, if not more certainly, calculated than the heights of mountains are. Some appearances, however, seemed to form insuperable objections. The most remarkable were those globes of fire called *meteors*, which sometimes appear, and are found to move at vast heights above the earth. A very remarkable one of this kind was seen by Sir Hans Sloane, and the account communicated to Dr Halley, who seems to have been greatly embarrassed by the phenomena attending it. The account given by Sir Hans Sloane is as follows: That "on Tuesday, March 19th 17th, about eight in the evening, passing eastward by the north-east corner of Southampton street in Bloomsbury Square, London, he saw of a sudden a very great light much surpassing that of the moon, which shone then very bright. Upon turning to observe it, he saw a long stream of very bright fire, branched in the middle; but at last it came to be pear-shaped, tapering upwards, and afterwards spherical, though not so big as the full moon. The colour of it was whitish, with a shade of blue, of a most vivid dazzling lustre, which seemed in brightness very nearly to resemble, if not to surpass, that of the body of the sun in a clear day. In about half a minute or less, it seemed to move over about 20° of the heavens, and to go out as much above the horizon, leaving a visible track behind it." All the other observers of this phe-

Strong ob-
jections
from the
great height
of meteors.

Atmo-
sphere.

nomenon agreed, that the splendour of this meteor was very little inferior to that of the sun; that within doors the candles scarce gave any light; and in the streets, not only the stars disappeared, but the moon, though then nine days old, and very near the meridian, could scarcely be seen, at least the cast no visible shade even where the beams of the meteor were intercepted by the houses; so that for a few seconds, in all respects it resembled perfect day.

6
Height and
magnitude
of a meteor
calculated
by Dr Hal-
ley.

Sir Hans Sloane, at London, observed this meteor about the Pleiades, descending a little beyond and below the stars in the belt of Orion. At Oxford, from the track it had left in the sky, it was found to have passed about $1\frac{1}{2}$ above the preceding shoulder of Orion, and about $3\frac{1}{2}$ above the middle of his belt, where there appeared a luminous nebula of reddish light, being a dilatation of the tract, seeming to have been occasioned by some explosion there; and there the observer was informed it first broke out. From this it proceeded, as to fence, in the arch of a great circle, and passing in the middle between the tail of Lepus (γ Bayero) and β in the forefoot of Canis Major, it terminated about $\frac{1}{2}$ in the breast of the same; and at the place of its extinction there remained a large whitish nebula, much broader and of a stronger light than the rest of the track, by which a very strong explosion was thought to be indicated. At Worcester it was observed to have left all Orion and Canis Major to the westward, and divided the distance between Sirius and Procyon, so as to be almost twice as far from Procyon as from Sirius.

From these observations, the distances of the three cities London, Oxford, and Worcester being known, as also the sun's place at that time, and the altitudes of the stars among which it passed, Dr Halley computes the height of the meteor to have been between 60 and $73\frac{1}{2}$ English miles from the surface of the earth, its diameter to have been 2800 yards, upwards of an English mile and an half, and its velocity more than 350 miles in a minute.

7
Phenomena
difficult to
be account-
ed for.

The perplexing circumstances here are, that, at such an height, the atmosphere of the earth ought to have no density sufficient to sustain flame of any kind, much less such an intensely dazzling one, and of such magnitude, as this meteor was. Add to this, that, without air, no sound could possibly have attended its explosion, nor indeed could any explosion have taken place; yet all accounts from Devonshire and Cornwall agreed that there was heard there a report as of a very great cannon, or rather a broadside at some distance, followed by a rattling noise, as if some small arms had been promiscuously discharged. The same was heard at London and in Sussex; nor was it known how far it extended, as we have certain accounts that it was heard beyond the city of Aberdeen in the north of Scotland. What was peculiar to this found was, that it was accompanied with an uncommon tremor in the air, so as to shake the glass-windows and doors, and, according to some, even the houses themselves, much beyond the usual effect of cannon though near. The learned Dr Halley acknowledges himself unable to reconcile these circumstances with the received theory of the height of the atmosphere; as in the regions in which this meteor moved, the air ought to have been 300,000 times rarer than what we breathe, and the next thing to a perfect

8
Dr Halley's
conjecture.

vacuum. He offers a kind of dubious conjecture indeed, that the extreme magnitude of the meteor might have compensated for the fineness of the medium. But this we think will hardly account for all the phenomena. According to this supposition, the explosion of a globe of fire 2800 yards in diameter in such a medium ought to be equivalent to the explosion of one 300,000 times less in the denser regions of our atmosphere. But globes are to one another as the cubes of their diameters; therefore, dividing 2800 by the cube-root of 300,000, we have the diameter of a sphere of fire, which ought to produce as extensive effects as this meteor, supposing it to explode at the surface of the earth, or in any part of the atmosphere of nearly the same density. The diameter of such a globe behoved to be almost 42 yards, or 126 feet; and though we must acknowledge the effects of such an explosion to be prodigious in those places that were in its neighbourhood, it is scarce probable that it could extend in such a manner over the whole island of Britain. The truth is, however, that here we have very few data to go upon; the largest flashes of lightning, or meteors that have been observed in the lower regions of the atmosphere, bearing but a very small proportion to a globe of 42 yards diameter.

The greatest difficulty, however, is to account for the brightness of the light. The appearance of meteors of this kind, and indeed of all kinds, are now attributed to electricity; but still the difficulty remains. We know that the electrical fluid pervades the vacuum of the air-pump with the utmost facility; but then it appears in long streams resembling the aurora borealis, not in small bright and concentrated sparks, as when drawn from a conductor, or discharged from a vial in the open air. To make this fluid exhibit a very bright vivid flash, the presence of the gross atmosphere seems necessary; and where that is taken off, the electric spark always diffuses itself over a large surface, and therefore becomes proportionably less bright. Experience shews, that though an electrified bottle will discharge itself through a great space of vacuum, yet the spark diverges and loses its force and brightness; whereas this meteor, which at first was long and branched, collected itself afterwards into a lesser compass; which is a very strong presumption of the pressure of a denser fluid; not to mention, that an explosion can be only made by a rare fluid forcing through a dense one. Thus gun-powder fired in the open air explodes, because the flame forces violently against the dense air; but though heated ever so much in *vacuo*, no such explosion is produced.

Instances have been known of balls of fire similar to this meteor, though vastly inferior in size and brightness, travelling along the surface of the ground, or along the sea, and afterwards bursting with an explosion. A very remarkable one of this kind is mentioned by Dr Priestley in his history of electricity. The substance of the account is, that as the observer (Mr Chalmers) was endeavouring to find the latitude, on board the Montague, Nov. 4th 1749, in Lat. $42^{\circ} 48'$, about 10 minutes before 12, he was desired by one of the quarter-masters to look to the windward. Upon which he observed a large ball of blue fire rolling on the surface of the water at about three miles distance from them. They immediately lowered their top-sails; but before

Atmo-
sphere.

9
Bright-
ness of its
light
analogous
to
diminishing
density of
the air.

10
Reman-
ent fire
rolling
the sea.

Atmo-
sphere.

before they could raise their main tack, it was advanced within 40 or 50 yards of the main chains. It now appeared as big as a large millstone; and, rising perpendicularly, went off with an explosion as if hundreds of cannon had been fired at once. The noise lasted about half a second; after which they found their maintop-mast shattered to pieces, and their main-mast rent quite down to the keel; five men were knocked down, and one greatly hurt, &c.

How the
gravity of
the air may
be diminished,
without
affecting its
density.

Now, though we can by no means pretend to give a reason why such large bodies of electric fire should thus be found travelling as it were in quest of adventures; yet as it seems indisputable that they actually do move in this unaccountable manner, both on the surface of the earth and at the height of 30, 40, 50, or 70 miles above it, it seems to some extremely probable, that, excepting the mere want of aqueous vapours, the atmosphere even at that great height is not much different in density from what we breathe. To those who consider the effects of the electric fluid upon light bodies on earth, the decrease of gravity in the superior regions of the atmosphere will be no argument of its want of density. We know, that it is the nature of any electrified substance to attract light bodies; and that, by proper management, they may even be suspended in the air, without either moving up or down, for a considerable time. If this is the case with light terrestrial bodies, it cannot be thought very improbable that the aerial particles themselves should be thus affected in those regions where electricity is so abundant. It is possible, therefore, that where the air is in a highly electrified state, its tendency towards the earth or its gravity may be very much diminished, without its density being at all affected; and if this is the case, it will no doubt occasion great difficulties in assigning the true height of the atmosphere, by rendering every barometrical observation exceedingly precarious.

Uncertainty
of baromet-
rical obser-
vations.

From these considerations, and many others that will naturally occur to every one who attends to this subject, it must appear that the height of our atmosphere is yet very far from being determined. At first the sinking of the barometer was thought to be a certain method of determining the degree of the atmospherical density on the tops of mountains, and in some of these it was even said that the air became too subtle for breathing; but this is now found to be a mistake. The French mathematicians, when on the top of one of the Andes, and above the common region of clouds, made no complaint of this kind. On the top of mount Aetna, where the smoke of the mountain sinks instead of rising, Mr Brydone found no inconvenience in this respect. Sir William Hamilton indeed says he did; but besides the conjecture mentioned under the article AETNA, we apprehend that the respiration may be affected on the top of a volcano, from so many different causes, that nothing can be concluded from thence. With regard to the barometer, M. De Luc hath been at incredible pains to ascertain and reduce to rule the irregularities of it, which he found to arise from the different temperature of the air; and it is to be hoped that by his labours the mensuration of altitudes by this instrument will be greatly facilitated, and the conclusions rendered much more certain than before, though whether the difficulties are entirely removed can only be determined by future experience. (See BAROMETER).

Atmo-
sphere
↓
Atomical.

¹³
Pressure of
the atmo-
sphere.

As all bodies which are immersed in the atmosphere of our earth must sustain its pressure, which is various at various times, it is plain, that this variation must occasion very considerable changes in these bodies. We have already mentioned, that the pressure of the atmosphere upon every square inch of the earth's surface is equivalent to 15 pounds. Hence, Dr Cotes hath computed that the pressure of the whole ambient fluid upon the earth's surface is equivalent to that of a globe of lead 60 miles in diameter. From this it also appears, that the pressure upon the human body must be very considerable; for, as every square inch of surface sustains a pressure of 15 pounds, every square foot, as containing 144 square inches, must sustain a pressure of 2160; and therefore, if a man's body contains 15 square feet of surface, which is pretty near the truth, he must sustain a weight of $2160 \times 15 = 32,400$ pounds, or sixteen tun, for his ordinary load, which, by the diminution or increase of the gravity of the atmosphere, may become heavier or lighter by near a whole tun. By this enormous pressure we should certainly be crushed to pieces in a moment, were not all parts of our bodies filled either with air, or with some other elastic fluid, the spring of which is sufficient to counterbalance the weight of the atmosphere. Whatever this fluid is, we are sure that it is just able to counterbalance the atmospherical gravity, and no more; for if any considerable pressure is superadded to that of the air, as by going into deep water, &c. it is always severely felt, let it be ever so equable. If the pressure is taken off from any part of the body, as by putting the hand upon the mouth of an open receiver which is afterwards exhausted, the weight of the atmosphere then discovers itself, and we imagine the hand is strongly sucked down into the glass. See PNEUMATICS.

¹⁴
Why we are
not crushed
by it.

To the above-mentioned changes in gravity of the atmosphere, we owe the prognostications of the weather by the barometer; but these changes seem to take place mostly in such places as are at a distance from the equator. In the torrid zone, though frequent and very great changes of weather happen, the barometer stands commonly at the same height, or with little variation. See BAROMETER.

For the causes of the elasticity of the atmosphere, see the article ELASTICITY; for the formation and ascent of vapour, see EVAPORATION; and for the other natural operations, see CONGELATION, COLD, RAIN, HAIL, SNOW, METEORS, &c.

ATOCK, the capital of a province of the same name in the dominions of the Great Mogul. It is situated on a point of land where two large rivers meet, and is one of the best fortresses the Mogul has; but formerly nobody was permitted to enter it without a passport from the Mogul himself. E. Long. 72. 10. N. Lat. 32. 20.

ATOM, in philosophy, a particle of matter, so minute, as to admit of no division. Atoms are the *minima naturæ*, and are conceived as the first principles or component parts of all physical magnitude.

ATOMICAL PHILOSOPHY, or the doctrine of atoms, a system which, from the hypothesis that atoms are endued with gravity and motion, accounted for the origin and formation of things. This philosophy was first broached by Mofchus, some time before the Trojan war; but was much cultivated and improved by Epi-

Atonement || **Atractylis**. Epicurus, whence it is denominated the *Epicurean philosophy*. See **EPICUREAN**.

ATONEMENT. See **EXPIATION**.

ATONY, in medicine, a defect of tone or tension, or a laxity or debility of the solids of the body.

ATRA BILIS, BLACK BILE, or MELANCHOLY. According to the ancients it hath a twofold origin: 1st, From the grosser parts of the blood, and thus they called the *melancholy humour*. 2^d, From yellow bile being highly concocted. Dr Percival, in his *Essays Med. and Exp. suggests*, that it is the gall rendered acrid by a stagnation in the gall-bladder, and rendered viscid by the absorption of its fluid parts. Bile in this state discharged into the duodenum, occasions universal disturbance and disorder, until it is evacuated; it occasions violent vomiting, or purging, or both; and previous to this the pulse is quick, the head aches, a delirium comes on, a hiccough, intense thirst, inward heat, and a fetid breath. Some describe this kind of bile as being acid, harsh, corroding, and, when poured on the ground, bubbling up, and raising the earth after the manner of a ferment. Dr Percival says, that by the use of the *infus. fenæ linoniet*. warmed with the *inct. columb.* he had checked the vomitings occasioned by this matter.

ATRA DIES, in antiquity, denotes a *fatal day*, whereon the Romans received some memorable defeat. The word literally imports a *black day*; a denomination taken from the colour, which is the emblem of death and mourning. Whence the Thracians had a custom of marking all their happy days with white stones or calculi, and their unhappy days with black ones; which they cast, at the close of each day, into an urn. At the person's death, the stones were taken out; and from a comparison of the numbers of each completion, a judgment was made of the felicity or infelicity of his course of life. The *dies atra*, or *atri*, were afterwards denominated *nefasti*, and *pofteri*. Such, in particular, was the day when the tribunes were defeated by the Gauls, at the river Allia, and lost the city; also that whereon the battle of Cannæ was fought; and several others marked in the Roman calendar as *atra* or unfortunate.

ATRACTYLIS, DISTAFF THISTLE; a genus of the polygamia æqualis order, belonging to the syngenesia class of plants.

Species. 1. The cancellata, or small cnicus, is an annual plant rising about eight or nine inches high, with a slender stem, garnished with hoary leaves, having spines on their edges. At the top of these branches are sent out two or three slender stalks, each terminated by a head of flowers like those of the thistle. The empalement is curiously netted over, and is narrow at the top, but swelling below; and contains many florets of a purplish colour. These are each succeeded by a single downy seed, which in cold years do not ripen in this country. 2. The humilis, or purple prickly cnicus, rises about a foot high, with indented leaves, having small spines on their edges. The upper part of the stalk is divided into two or three slender branches, each supporting a head of purple flowers, having rays inclosed in a scaly empalement. The flowers appear in June; but unless the season is warm, the seeds will not ripen in this country. 3. The gummifera, or prickly gum-bearing cnicus, known among physicians by the

name of *carline thistle*. This sends out many narrow leaves, which are deeply serrated, and armed with spines on their edges. These lie close on the ground; and between them the flower is situated, without a stalk, and having many florets inclosed in a prickly empalement. Those on the border are white; but such as compose the disk are of a yellowish colour. It flowers in July, but never perfects seeds in Britain.

Culture. All these plants are natives of the warm parts of Europe, as Spain, Sicily, and the Archipelago islands, from whence their seeds must be procured. They must be sown upon an open bed of light earth, where the plants are to remain; and when the plants come up, they should be thinned, so as to leave them three or four inches asunder. The roots of the second will last two or three years, and the third is a perennial plant.

Medicinal Uses. The root of the third sort was formerly used as a warm diaphoretic and alexipharmic; but it never came much into use in Britain, and the present practice has entirely rejected it. The root is about an inch thick, externally of a pale rusty brown colour, corroded as it were in the surface; and perforated with numerous small holes, so as to appear worm-eaten when cut. It has a strong smell, and a subacid, bitterish, and weakly aromatic taste. Frederic Hoffman the Elder, relates, that he has observed a decoction of it in broth to occasion vomiting.

ATRÆTI, in medicine, infants having no perforation in the anus, or persons imperforated in the vagina or urethra.

ATRAPHAXIS, a genus of the digynia order, belonging to the hexandria class of plants, for which there is no English name. There are two species, both natives of warm countries; but their properties are too trifling to merit any particular description.

ATREUS, in fabulous history, the son of Pelops and Hippodamia, and the father of Agamemnon and Menelaus, is supposed to have been king of Mycenæ and Argos about 1228 years before the Christian æra. He drove his brother Thyestes from court, for having a criminal commerce with Ærope his wife: but understanding that he had had two children by her, he sent for him again, and made him eat them; at which horrid action, the sun, it is said, withdrew his light.

ATRI, a town of Italy, in the farther Abruzzo in the kingdom of Naples, with the title of a duchy; it is the see of a bishop, and is seated on a craggy mountain, four miles from the Adriatic Sea. E. Long. 13. 8. N. Lat. 42. 45.

ATRIPLEX, ORACH, or ARACH; a genus of the monœcia order, belonging to the polygamia class of plants.

Species. 1. The hortensis, or garden orach, was formerly cultivated in gardens, and used as a substitute for spinach, to which it is still preferred by some, tho' in general it is disliked by the English; however, it still maintains its credit in France, as also in the northern parts of England. There are three or four varieties of this plant, whose only difference is their colour; one is a deep green, another a dark purple, and a third with green leaves and purple borders. 2. The halimus, or broad-leaved orach, was formerly cultivated in gardens as a shrub, by some formed into hedges, and constantly sheared to keep them thick: but this is a purpose

Atraphaxis
Atriplex

Atropis,
Atropa.

pose to which it is by no means adapted, as the shoots grow so vigorous, that it is impossible to keep the hedge in any tolerable order; and what is worse, in severe winters the plants are often destroyed. 3. The petulacoides, or shrubby sea-orach, grows wild by the sea-side in many places of Britain. It is a low under-shrub, seldom rising above two feet and an half, or at most three feet high; but becomes very bushy. This may have a place in gardens among other low shrubs, where it will make a pretty diversity. Besides these, nine other species are enumerated by botanical writers, but the above-mentioned are the most remarkable.

Culture, &c. The first sort is annual, so must be propagated by seeds. These are to be sown at Michaelmas, soon after the seeds are ripe. The plants require no other culture than to be kept free from weeds, to hoe them when they are about an inch high, and to cut them down when they are too thick, so as to leave them about four inches asunder. When these plants are sown in a rich soil, and allowed a good distance from each other, the leaves will grow very large, and in this their goodness consists. This must be eaten whilst it is young; for when old, the leaves become tough, and are good for nothing. This species is an article of the materia medica; a decoction of the leaves is recommended in costiveness, where the patient is of a hot bilious disposition.—The second sort may be propagated by cuttings. These are to be planted in any of the summer-months, in a shady border; where they will soon take root, and be fit against the following Michaelmas to transplant into those places where they are to remain.—The third sort requires very little culture. It may be also propagated from cuttings, and is to be planted in a poor gravelly soil.

ATROPA, DEADLY NIGHT-SHADE; a genus of the monogynia order, belonging to the pentandria class of plants.

Species. Of this genus there are five species enumerated by the botanists; the three following are the most remarkable. 1. The belladonna grows wild in many parts of Britain. It hath a perennial root, which sends out strong herbaceous stalks of a purplish colour, which rise to the height of four or five feet, garnished with entire oblong leaves, which towards autumn change to a purplish colour. The flowers are large, and come out singly between the leaves, upon long foot-stalks; bell shaped, and of a dusky colour on the outside, but purplish within. After the flower is past, the germen turns to a large round berry a little flattened at the top. It is first green; but, when ripe, turns to a shining black, sits close upon the empalement, and contains a purple juice of a nauseous sweet taste, and full of small kidney-shaped seeds. 2. The frutescens is a native of Spain, and rises with a shrubby stem to the height of six or eight feet; dividing into many branches garnished with round leaves, in shape like those of the storax tree: these are placed alternately on the branches. The flowers come out between the leaves on short foot-stalks, shaped like those of the former, but much less; of a dirty yellowish colour, with a few brown stripes; but these are never succeeded by berries in Britain. 3. The herbacea, with an herbaceous stalk, is a native of Cambrachy. This hath a perennial root, which puts forth several channelled herbaceous stalks rising about two

feet; and towards the top they divide into two or three small branches garnished with oval leaves four inches long and three broad, having several prominent transverse ribs on their under side. The flowers come out from between the leaves on short foot-stalks; they are white, and shaped like those of the common sort, but smaller. It flowers in July and August, but seldom ripens its fruit in Britain.

Culture. The first species, which is remarkable for its poisonous qualities, is very seldom admitted in gardens, nor should it ever be cultivated or allowed to grow in those places to which children have access. The other kinds are propagated by seeds, and placed in a stove, as is requisite for the more tender plants.

Poisonous Qualities, &c. The first species, as we have already observed, is a strong poison. Mr Ray gives a good account of the symptoms that follow the taking of it inwardly, by what happened to a mendicant friar upon his drinking a glass of mallow wine in which the herb was infused. In a short time he became delirious, and soon after was seized with a grinning laughter; then with several irregular motions, and at last with a real madness, and such a stupidity as those have who are foolishly drunk; but after all, he was cured by a draught of vinegar. Buchanan also gives an account of the destruction of the army of Sweno the Dane, when he invaded Scotland, by mixing a quantity of the belladonna berries with the drink which the Scots were, according to a treaty of truce, to supply them with. This so intoxicated the Danes, that the Scots fell upon them in their sleep, and killed the greatest part of them, so that there were scarcely men enough left to carry off their king. There have also been many instances in Britain of children being killed by eating berries of a fine black colour, and about the size of a small cherry, which are no other than those of belladonna. Notwithstanding this virulent quality, however, some have prescribed it as a cure for cancers; but whatever may be pretended from some instances, it seems very unlikely that this terrible disease should be cured, or even alleviated in the least, by any such means.

ATROPHY, in medicine, a disease, wherein the body, or some of its parts, do not receive the necessary nutriment, but waste and decay incessantly *.

ATROPOS, in fabulous history, the name of the third of the Parcae, or Fates, whose business it was to cut the thread of life.

ATTACHMENT, in the law of England, implies the taking or apprehending a person by virtue of a writ or precept. It is distinguished from an *arrest*, by proceeding out of a higher court by precept or writ; whereas the latter proceeds out of an inferior court by precept only. An arrest lies only on the body of a man; whereas an attachment lies often on the goods only, and sometimes on the body and goods. An attachment by writ differs from *distress*, in not extending to lands, as the latter does; nor does a distress touch the body, as an attachment does.

ATTACHMENT out of the Chancery, is obtained upon an affidavit made, that the defendant was served with a subpoena, and made no appearance; or it issues upon not performing some order or decree. Upon the return of this attachment by the sheriff, *quod non est inventus in balliva sua*, another attachment, with a proclamation, issues; and if he still refuses to appear, a com-

Atropa
||
Attachment

* See the
Index sub-
joined to
Medicine.

Attach-
ment
||
Attainder.

commission of rebellion.

ATTACHMENT of the *Forest*, is one of the three courts held in the forest. The lowest court is called the *court of attachment*, or *wood-mote court*; the mean, *swan-mote*; and the highest, the *justice in eyre's seat*. The court of attachments has its name from the verduers of the forest having no other authority in it, but to receive the attachments of offenders against vert and venison taken by the foresters, and to enroll them, that they may be presented or punished at the next justice in eyre's seat. This attachment is by three means: by goods and chattels; by body, pledges, or main-prize; or by the body only. This court is held every 40 days throughout the year; and is thence called *forty-days court*.

Foreign ATTACHMENT is an attachment of money or goods found within a liberty or city, to satisfy some creditor within such liberty or city. By the custom of London, and several other places, a man can attach money or goods in the hands of a stranger, to satisfy himself.

ATTACK, a violent attempt upon any person or thing, an assault, or the act of beginning a combat or dispute.

ATTACK, in the military art, is an effort made to force a post, break a body of troops, &c.

ATTACK of a *siege*, is a furious assault made by the besiegers with trenches, covers, mines, &c. in order to make themselves masters of a fortress, by storming one of its sides. If there are two or three attacks made at the same time, there should be a communication betwixt them. See *SIEGE*.

ATTAINER, in law. When sentence of death, the most terrible and highest judgment in our laws, is pronounced, the immediate inseparable consequence by the common law is attainder. For when it is now clear beyond all dispute, that the criminal is no longer fit to live upon the earth, but is to be exterminated as a monster and a bane to human society, the law sets a note of infamy upon him, puts him out of its protection, and takes no farther care of him than barely to see him executed. He is then called *attaint*, *attindus*, *stained*, or *blackened*. He is no longer of any credit or reputation; he cannot be a witness in any court; neither is he capable of performing the functions of another man: for, by an anticipation of his punishment, he is already dead in law. This is after judgment: for there is great difference between a man *convicted*, and *attainted*; though they are frequently through inaccuracy confounded together. After conviction only, a man is liable to none of these disabilities: for there is still in contemplation of law a possibility of his innocence. Something may be offered in arrest of judgment: the indictment may be erroneous, which will render his guilt uncertain, and thereupon the present conviction may be quashed: he may obtain a pardon, or be allowed the benefit of clergy; both which suppose some latent sparks of merit, which plead in extenuation of his fault. But when judgment is once pronounced, both law and fact conspire to prove him completely guilty; and there is not the remotest possibility left of any thing to be said in his favour. Upon judgment therefore of death, and not before, the attainer of a criminal commences: or upon such circumstances as are equivalent to judgment of death; as judgment of

outlawry on a capital crime, pronounced for absconding or fleeing from justice, which tacitly confesses the guilt: And therefore, upon judgment either of outlawry, or of death, for treason or felony, a man shall be said to be attainted.

A person attainted of high treason forfeits all his lands, tenements, and hereditaments; his blood is corrupted, and he and his posterity rendered base; and this corruption of blood cannot be taken off but by act of parliament.*

Attainers may be reversed or falsified, (i. e. proved to be false) by writ of error, or by plea. If by writ of error, it must be by the king's leave, &c.; and when by plea, it may be by denying the treason, pleading a pardon by act of parliament, &c.

Persons may be attainted by act of parliament.—Acts of attainder of criminals have been passed in several reigns, on the discovery of plots and rebellions, from the reign of king Charles II. when an act was made for the attainder of several persons guilty of the murder of king Charles I. Among acts of this nature, that for attainting Sir John Fenwick, for conspiring against king William, is the most remarkable; it being made to attain and convict him of high treason on the oath of one witness, just after a law had been enacted, "That no person should be tried or attainted of high treason where corruption of blood is incurred, but by the oath of two lawful witnesses, unless the party confess, stand mute, &c." Stat. 7 and 8 W. 3. cap. 3. But in the case of Sir John Fenwick, there was something extraordinary; for he was indicted of treason on the oaths of two witnesses, though but only one could be produced against him on his trial.

ATTAINT, is a writ that lies after judgment against a jury of twelve men that have given false verdict in any court of record, in an action real or personal, where the debt or damages amount to above 40s. Stat. 5 and 34 Ed. III. c. 7. It is called *attaint*, because the party that obtains it endeavours thereby to stain or taint the credit of the jury with perjury, by whose verdict he is grieved.

The jury who are to try this false verdict must be twenty-four, and are called the *grand jury*; for the law wills not that the oath of one jury of twelve men should be attainted or set aside by an equal number, nor by less indeed than double the former. And he that brings the attaint can give no other evidence to the grand jury, than what was originally given to the petit. For as their verdict is now trying, and the question is whether or no they did right upon the evidence that appeared to them, the law adjudged it the highest absurdity to produce any subsequent proof upon such trial, and to condemn the prior justification for not believing evidence which they never knew. But those against whom it is brought are allowed, in the affirmation of the first verdict, to produce new matter: because the petit jury may have formed their verdict upon evidence of their own knowledge, which never appeared in court; and because very terrible was the judgment which the common law inflicted upon them, if the grand jury found their verdict a false one. The judgment was, 1. That they should lose their *liberam legem*, and become for ever infamous. 2. That they should forfeit all their goods and chattels. 3. That their lands and

* See article on future of Blood.

tene-

tenements should be seized into the kings hands. 4. That their wives and children should be thrown out of doors. 5. That their houses should be rased and thrown down. 6. That their trees should be rooted up. 7. That their meadows should be ploughed. 8. That their bodies should be cast into jail. 9. That the party should be restored to all that he lost by reason of the unjust verdict. But as the severity of this punishment had its usual effect, in preventing the law from being executed, therefore by the statute 11 Hen. VII. c. 24. revived by 23 Hen. VIII. c. 3. and made perpetual by 13 Eliz. c. 25. it is allowed to be brought after the death of the party, and a more moderate punishment was inflicted upon attainted jurors; viz. perpetual infamy, and if the cause of action were above 40*l.* value, a forfeiture of 20*l.* apiece by the jurors; or, if under 40*l.* then 5*l.* apiece; to be divided between the king and the party injured. So that a man may now bring an attaint either upon the statute or at common law, at his election; and in both of them may reverse the former judgment. But the practice of setting aside verdicts upon motion, and granting new trials, has so superseded the use of both sorts of attaints, that there is hardly any instance of an attaint later than the 16th century.

ATTAIN, among farriers, a knock or hurt in a horse's leg, proceeding either from a blow with another horse's foot, or from an over-reach in frosty weather, when a horse, being rough-shod, or having shoes with long caulkers, strikes his hinder feet against his fore-leg.

ATTAINED, in law, is applied to a person's being under attainer. See ATTAINDER.

ATTALUS, the name of several kings of Pergamus. See PERGAMUS.

ATTELABUS, in zoology, a genus of insects belonging to the order of coleoptera or beetle-kind. It has four wings, of which the superior are crustaceous, and serve as a sheath or cover to the inferior, which are membranous. The head tapers behind, and is inclined; the feelers turn thicker towards the apex. The species are 13; viz. 1. The coryli is black, with red elytra or crustaceous wings. 2. The avellana is black, with the breast, feet, and elytra red. 3. The curculionoides is black, with red elytra and breast. The above three species frequent the leaves of the hazel and filbert nut-trees. 4. The surinamensis has a double indentation (or two teeth) in the top of the elytra. It is a native of Surinam. 5. The pensilvanicus is black, with red elytra, a black belt round the middle, and another towards the apex of the elytra. It is a native of Philadelphia. 6. The melanurus is black, with testaceous elytra, black at the apex. It is a native of Sweden. 7. The betula has saltatory or springy legs, and the whole body is of a dark-red colour. It frequents the leaves of the birch-tree. 8. The formicarius is black, with red elytra, and a double white belt towards the base. It is a native of Europe. 9. The sphyllus is green, with a hairy breast, and a double yellow belt upon the elytra. 10. The apiaris

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is bluish, with red elytra, and three black belts. It is a native of Germany. 11. The mollis is yellowish and hairy, with pale elytra, and three belts. It is a native of Europe. 12. The ceramoides is of a blackish red colour, and the elytra is furrowed. It frequents the spongy boletus, a species of mushroom. 13. The bupestoides is of a dark-red colour, with a globular breast, and nervous elytra. It is a native of Europe.

ATTENUANTS, medicines which relieve the viscosity of the humours; and thereby promoting their circulation, as well as the discharge of all noxious or excrementitious matter.

ATTENTION, is that state of mind which prepares one to receive impressions. According to the degree of attention, objects make a stronger or weaker impression (A). Attention is requisite even to the simple act of seeing: the eye can take in a considerable field at one look; but no object in the field is seen distinctly, but that singly which fixes the attention: in a profound reverie that totally occupies the attention, we scarce see what is directly before us. In a train of perceptions, no particular object makes such a figure as it would do singly and apart; for when the attention is divided among many objects, no particular object is intitled to a large share. Hence, the stillness of night contributes to terror, there being nothing to divert the attention:

Horror ubique animos, simul ipsa silentia terrent. *Æneid. ii.*

Zoro. Silence and solitude are ev'ry where!

"Through all the gloomy ways and iron doors
That hither lead, nor human face nor voice
Is seen or heard. A dreadful din was wont
To grate the sense, when enter'd here, from groans
And howls of slaves condemn'd, from clink of chains,
And crash of rusty bars and creaking hinges;
And ever and anon the light was dash'd
With frightful faces, and the meagre looks
Of grim and ghastly executioners.
Yet more this stillness terrifies my soul
Than did that scene of complicated horrors.

Mourning Bride, act 5. sc. 8.

In matters of slight importance, attention is mostly directed by will; and for that reason, it is our own fault if trifling objects make any deep impression. Had we power equally to withhold our attention from matters of importance, we might be proof against any deep impression. But our power fails us here: an interesting object seizes and fixes the attention beyond the possibility of control; and while our attention is thus forcibly attached to one object, others may solicit for admittance; but in vain, for they will not be regarded. Thus a small misfortune is scarce felt in presence of a greater:

Lear. Thou think'st 'tis much, that this contentious storm
Invades us to the skin; so 'tis to thee;
But where the greater malady is fix'd,
The lesser is scarce felt. Thou'dst thou a bear;
But if thy flight lay toward the roaring sea,
Thou'dst meet the bear i' th' mouth. When the mind's free,
The body's delicate: the tempest in my mind
Doth from my senses take all feeling else,
Save what beats there.

King Lear, act 3. sc. 5.

ATTERBURY (Dr Francis), son of Dr Lewis Atterbury,

(A) Bacon, in his natural history, makes the following observations. "Sounds are meliorated by the intention of the sense, where the common sense is collected most to the particular sense of hearing, and the sight suspended. "Therefore sounds are sweeter, as well as greater, in the night than in the day; and I suppose they are sweeter to blind men than to others: and it is manifest, that between sleeping and waking, when all the senses are bound and suspended, music is far sweeter than when one is fully waking."

Atterbury.

Atterbury, was born at Milton in Buckinghamshire, 1662; educated at Westminster; and from thence elected to Christ-Church in Oxford, where he distinguished himself early by his fine genius and turn for polite literature. The year he was made M. A. 1687, he exerted himself in the controversy with the Papists, vindicated Luther in the strongest manner, and shewed an uncommon fund of learning, enlivened with great vivacity: he was indeed seldom disengaged from literary disputes, either religious or political; and was thought to have had no inconsiderable part in the famous controversy between Mr Boyle and Dr Bentley, about the genuineness of Phalaris's epistles. Q. Anna, upon her accession to the throne, appointed him her chaplain. In September following, he was presented to the deanry of Carlisle. A funeral sermon of his engaged him in a dispute with Mr Hoadly, afterward bishop of Winchester, concerning the advantages of virtue with regard to the present life. His Latin sermon to the clergy of London at Zion-College, upon Rom. xiii. 1. published by him in 1708, engaged him in another dispute with Hoadly about passive obedience. In 1710 he was supposed to have been very assiduous to Dr Sacheverel. The same year he was chosen prolocutor in the convocation of the clergy of the province of Canterbury; and the management of affairs in the lower house was principally directed by him. In 1713 he was promoted to the see of Rochester; and had a considerable interest in the ministry at that time. During the rebellion in Scotland, when the Pretender's declaration was dispersed, the archbishop of Canterbury, and the bishops in and near London, had published a *Declaration of their Abhorrence of the present Rebellion, and an Exhortation to the clergy and people to be zealous in the discharge of their duties to his Majesty King George*: but the bishop of Rochester refused to sign it; and engaged bishop Smalridge in the same refusal, on account of some reflections it contained against the high-church party. He appeared generally among the protestors against the measures of the ministry under the king, and drew up the reasons of the protests with his own hand. In 1722 he was committed prisoner to the tower of London for high treason. What share he is said to have had in the conspiracy appears from the *Report of the Secret Committee of the House of Commons*; which occasioned a resolution in that house, March 11, 1723, 'That Francis lord bishop of Rochester was principally concerned in forming, directing, and carrying on, a wicked and detestable conspiracy, for invading these kingdoms with a foreign force, and for raising insurrections and a rebellion at home, in order to subvert our happy establishment in church and state, by placing a popish pretender on the throne.' In consequence of this, a bill was brought in to inflict pains and penalties upon him, which received the royal assent, May 27. To mitigate the sentence of banishment, his daughter was permitted to attend him. He softened the rigour of his exile by study, and conversation with men of letters. It is said he translated *Virgil's Georgics* into English, and wrote an *Harmonia Evangelica*. He also wrote a vindication of himself, bishop Smalridge, and Dr Aldrich, from a charge brought against them by Mr Oldmixon, of altering and interpolating the lord Clarendon's history of the

rebellion. He died at Paris, Feb. 15th, 1731; and his body was brought to England, and interred in Westminster abbey. Though his character is differently represented by different parties, it is universally allowed that he had uncommon abilities, was a fine writer, and a most excellent preacher. His sermons are printed in four volumes 8^{vo}.

ATTESTATION, the act of affirming or witnessing the truth of something, more especially in writing.

ATTIC, any thing relating to Attica, or to the city of Athens: thus Attic salt, in philology, is a delicate poignant sort of wit and humour peculiar to the Athenian writers; Attic witness, a witness incapable of corruption, &c.

ATTIC Order. See ARCHITECTURE, n^o 58.

ATTIC Base, a peculiar kind of base used by the ancient architects in the Ionic order; and by Palladio, and some others, in the Doric.

ATTIC Story, in architecture; a story in the upper part of a house, where the windows are usually square.

ATTICA, an ancient kingdom of Greece, situated along the north coast of the gulph of Saron, bounded on the west by Megara, mount Cithæron, and part of Bœotia; on the north by the gulph of Euripus, now *Stretto di negro ponte*, and the rest of Bœotia; and on the east by the Eurapius. It extended in length from north-west to south-east about 60 miles; its breadth from north to south was 56, decreasing as it approached the sea.

The soil of this country was naturally barren and craggy, though by the industry of its inhabitants it produced all the necessaries of life. On this account Attica was less exposed to invasions than other more fertile countries; and hence it preserved its ancient inhabitants beyond all the other kingdoms in its neighbourhood; so that they were reputed to be the spontaneous productions of the soil; and as a badge of this, Thucydides tells us, they wore golden grasshoppers in their hair.

The chief cities in the kingdom of Attica were Athens the capital; next to it, Eleusis, situated on the same gulph, near the coasts of Megara; and next to that, Rhamnus, famed for the temple of Amphiaræus and the statue of the goddess Nemesis.

The first king of this country, of whom we have any distinct account, was Cecrops. Others indeed are said to have reigned before him, particularly one Actæus, whose daughter Cecrops married, and in her right laid the foundation of his new monarchy. Cecrops is said to have been the first who deified Jupiter, set up altars and idols, and instituted marriage among the Greeks. He is likewise affirmed to have taught his subjects navigation, and for the better administration of justice, and promoting intercourse among them, to have divided them into the first four tribes called *Cecropis*, *Autochthon*, *Actæa*, and *Paralia*; and he is also by some said to be the founder of the Areopagus. From this monarch the Athenians affected to call themselves *Cecropidae* till the reign of Erechtheus their sixth king, after whom they took the name of *Erechthyde*.

Cecrops dying after a reign of 50 years, left three daughters, by marrying one of which, probably, Cranaus a wealthy citizen ascended the throne. He enjoyed his crown peaceably for ten years; till, having married one of his daughters, named *Atthis*, to Amphic-
tyon

Attestatio
Attica.

Boundaries
extents.

Inhabitants
thought
to be produced
from the soil.

Cities.

Cecrops
the first
king.

Cranaus.

Attica. tyon the son of Deucalion, he was by him dethroned, and forced to lead a private life to the last. From this daughter, the country which before had been called *Aliea*, took the name of *Attica*.

After a reign of ten or 12 years, Amphictyon was himself depoted by Erichthonius, said to be the son of Vulcan and Tethys: being lame of both his feet, he is said to have invented coaches, or, as others will have it, instituted horse and chariot races in honour of Minerva. He is also reported to have been the first who stamped silver coin. He reigned 50 years, and was succeeded by his son Pandion the father of Progne and Philomela; whose hard fate, so famous among the poets, is supposed to have broke his heart, after a reign of about 40 years. In his time Triptolemus taught the Athenians agriculture, which he had learned from Ceres.

Pandion was succeeded by his son Erechtheus, who being reckoned the most powerful prince of his time, Boreas king of Thrace demanded his daughter Orithia in marriage, and on being refused carried her off by force. After a reign of 50 years, Erechtheus being killed in a battle with the Eleusians, was succeeded by his son Cecrops II. who is generally allowed to have been the first who gathered the people into towns; they having till then lived in houses and cottages scattered here and there, without order or regular distance. After a reign of 40 years he was driven out by his brethren Metion and Pandorus, who forced him to fly into *Ægialea*, where he died.

Cecrops II. was succeeded by his son Pandion II. and he was likewise driven out by Metion, who assumed the government. Pandion in the mean time fled into Megara, where he married Pelia the daughter of Pylas king of that place, and was appointed successor to the kingdom. Here he had four sons, who returning to Athens, whether with or without their father is uncertain, expelled the sons of Metion, and after the decease of Pandion their father, divided the government among themselves; notwithstanding which, the royal dignity did in effect remain with *Ægeus* the eldest.

Ægeus, when he ascended the throne, finding himself despised by his subjects because he had no sons, and sometimes insulted by his brother Pallas who had no less than fifty, consulted the oracle of Apollo at Delphi. Receiving here, as was commonly the case, an answer which could not be understood without a commentator, he applied to Pittheus king of Troezen, famous for his skill in expounding oracles. This prince easily prevailed with him to lie with his daughter *Æthra*, who proved with child; and as none but these three were privy to the secret, *Ægeus*, before his return to Athens, hid a sword and a pair of shoes under a stone, leaving orders with the princess, that if the child proved a boy, she should send him to Athens with these tokens, as soon as he was able to lift up that stone. He charged her moreover to use all imaginable secrecy, lest the sons of his brother Pallas should way-lay and murder him.

Æthra being delivered of a son, Pittheus gave out that Neptune was the father of it. This child was named *Theus*, and proved one of the most famous heroes of antiquity. Being arrived at the age of 16, his mother brought him to the stone above-mentioned; and he having lifted it with ease, was desired to take

up the sword and shoes, and prepare himself to go to his father. He was advised to go by sea rather than by land, as, ever since the departure of Hercules, the roads had been exceedingly infested by banditti. Theus, however, who had already begun to discover marks of uncommon strength and courage, no longer heard the name of Hercules mentioned, than he became desirous of imitating so great a pattern, and after performing a number of glorious exploits, for which see the article *Theus*, he arrived safe at his father's capital.

The great achievements of our young hero procured him a welcome reception at the court of *Ægeus*, though his birth was unknown to all except Medea, to whom the king had lately been married. This queen being a sorceress, it is not to be supposed any thing could be concealed from her: she therefore, by her diabolical penetration, quickly found out that Theus was the king's son; after which he became so jealous of him on account of his valour, that he persuaded her old husband to invite the young stranger to a banquet, and poison him in a glass of wine. The poison was accordingly prepared, and Theus invited; but the prince suddenly drawing his sword, it was immediately recognized by *Ægeus* to be the same he had formerly buried below the stone. Upon this, he stepped forward to Theus, throwing down the poisoned draught in his way, and, embracing him with much tenderness, owned him for his son before all the court.

At this time the king of Athens had great occasion for such a champion as Theus. The sons of Pallas, who had all along behaved with great insolence, upon Theus being discovered to be the king's son, and heir apparent to the crown, broke out in open rebellion. They were soon discomfited; but *Ægeus* and the whole country of Attica were still in great distress on the following account. Some years before, Androgeus, the son of Minos king of Crete, came to Athens to be present at one of their feasts. During this visit he contracted such an intimacy with the fifty sons of Pallas, that *Ægeus*, fearing some fatal consequences, caused him to be privately murdered. According to others, Androgeus having undertaken to encounter the Marathonian bull, was killed by it. Be this as it will, Minos having received news of his son's death, imputed it to the people of Attica; and therefore, after several unsuccessful attempts to revenge his own quarrel, prayed to the gods to do it for him. The Athenians, in consequence of this prayer, were visited with earthquakes, famine, and pestilence, on account of which they applied to the oracle. Here they were informed, that no relief was to be had till they were reconciled to the Cretan king. Minos resolving to make them pay dear for their deliverance, imposed upon them a tribute of seven young men, and as many virgins, whom he condemned to be devoured by the Minotaur, a monster feigned by the poets to have been half man and half bull. This bloody tribute had been twice paid, and Minos had already sent his messengers the third time, when Theus willingly offered himself to be one of the unhappy victims, and embarking with them in one ship, he gave the pilot two sails, the one black to sail with, and the other white to be hoisted up at his return in case he came off victorious. Our hero had all the success he could wish; he killed the

Attica.
16
Death of
Ægeus.

Minotaur, prevailed with Minos to remit the tribute, and his daughter Ariadne to run away with him; but her he left with child in the isle of Naxos. Unfortunately, however, for Ægeus, the joy of Theseus and his company was so great, that at their return they forgot to hoist the white flag in token of their victory: upon which the old king, taking for granted that his son was killed, threw himself into the sea, which ever since has from him been called the *Ægean Sea*.

17
Theseus
king of At-
tica.

18
New-mo-
dels the go-
vernment.

Theseus, being thus left in possession of the kingdom of Attica, began immediately to think of indulging his warlike genius, and rendering the civil affairs of his kingdom as little troublesome as possible. To accomplish this purpose, he began with gathering most of the people of Attica into the old and new town, which he incorporated into one city. After this he divested himself of all his regal power, except the title of king, the command of the army, and the guardianship of the laws. The rest he committed to proper magistrates chosen out of three different orders of the people, whom he divided into nobles, husbandmen, and artificers. The first he invested with the power of interpreting and executing the laws, and regulating whatever related to religion. The other two chose their inferior magistrates from among themselves, to take care of whatever related to their separate orders: so that the kingdom was in some measure reduced to a commonwealth, in which the king had the greatest post; the nobles were next to him in honour and authority; the husbandmen had the greatest profit; and the artists exceeded them in number. He likewise abolished all their distinct courts of judicature, and built one common council hall called *prytaneum*, which stood for many ages afterwards.

Having thus new-modelled the government, his next care was to join to his dominions the kingdom of Megara, in right of his grandfather Pandion II. who had married the daughter of Pylas, as abovementioned. On this occasion he erected the famous pillar in the isthmus, which shewed the limits of the two countries that met there. On the one side of this pillar was inscribed, "This is not Peloponnesus, but Ionia;" and on the other, "This is Peloponnesus, not Ionia." After this he undertook an expedition against the Amazons, whom he overcame, took their queen Hippolyta, and afterwards married her. Soon after this, Theseus contracted an intimacy with Pirithous the son of Ixion, and being invited to his nuptials, assisted him in killing a number of Centaurs, or rather Thessalian horse-men, (who in their cups had offered violence to their female guests); and drove the rest out of the country. Our two associates then proceeded to Sparta, where Theseus fell in love with the famed Helena, at that time not above nine years old, while he himself was upwards of fifty. Her they carried off; and of the rape there are various accounts; but the following one, which is given by Plutarch, is generally allowed to be the most authentic.

According to that historian, they stole this beauty, the greatest in the world at that time, out of the temple of Diana Orta, where Helena happened to be dancing. They were pursued as far as Tegea, but made their escape out of Peloponnesus; and thinking themselves now secure of their prey, they agreed to cast lots for her, upon condition that he to whose lot she fell should assist the other in procuring some celebrated

beauty. Fortune having declared for Theseus, he assisted his companion in the like attempt upon Proserpina daughter of Aidonius king of the Molossi in Epirus, who, being the next beauty to Helena, was guarded by the dog Cerberus, which had three heads, and was consequently a very formidable enemy. Her father, however, understanding that they designed to steal away his daughter, threw Pirithous to be torn in pieces by Cerberus, and put Theseus in prison, from whence he was afterwards relieved at the intercession of Hercules.

After this misfortune, Theseus at length returned to Athens, but found himself very coolly received by his subjects. Mneſtheus, the son of Pteus, and great-grandson of Erectheus, had made use of the king's absence to ingratiate himself with the people; and, upon the commencement of a war with Castor and Pollux, the two brothers of Helena, he persuaded the people of Athens to open their gates to the two brothers. Upon this, Theseus was under the necessity of conveying away himself and family with all possible privacy. This he luckily accomplished; and designed to have sailed to Crete, to have obtained assistance from Deucalion son of Minos, and now brother-in-law to Theseus himself, he having lately married Phædra sister to Deucalion. Unfortunately, however, our hero was shipwrecked on the island of Scyros. Here he was at first kindly received by Lycomedes the king of that island; but was soon after killed by a fall from a high rock, over which some say he was pushed by Lycomedes himself, who had been prevailed upon to destroy Theseus in that manner by Mneſtheus, that he might with the more security enjoy the kingdom of Athens.

Mneſtheus reigned 24 years, but lost his life at the siege of Troy; and was succeeded by Demophon one of the sons of Theseus by Phædra, who was likewise at the siege of Troy, but had the good fortune to return in safety. In his reign was erected the famous court of the Æphete; consisting originally of 50 Athenians and as many Argives, for trying of wilful murders. By this court the king himself afterwards submitted to be tried for having accidentally killed one of his subjects. He reigned 33 years, and was succeeded by his son, according to some, or according to others his brother, Oxyntes, who reigned 12 years. Oxyntes was succeeded by his son Aphydas, who was murdered by Thymetes the bastard son of Oxyntes.

This king discovered many base qualities unworthy of his dignity; and at last was deposed by his subjects on the following occasion. Xanthus king of Boeotia had a contest with the Athenians about one of their frontier towns. He offered to decide the matter by single combat with the king; but this was declined by Thymetes. It happened, that at that time one Melanthus a Messenian, who had been driven out of his country by the Heraclidae, was come to Athens; who accepted the king of Boeotia's challenge. At the first onset, Melanthus asked his adversary, why he had, contrary to the articles, brought a second into the field with him? and as Xanthus immediately looked about to see who was behind him, Melanthus run hnn thro' with his lance. This victory, though it did little honour to him who gained it, was so agreeable to the Athenians, that they deposed their cowardly king Thymetes, after he had reigned 8 years; and appointed Melanthus in his stead, who after a reign of 37 years left the king-
dom

19
Defeats the
Amazons,
kills the
Centaurs,
and carries
off Helena.

Im by of

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Th dep

Mel

Attica. dom to his son Codrus.

This prince reigned about 21 years; during which time the Diores and Heraclidæ had regained all Peloponnesus, and were upon the point of entering into Attica. Codrus, being informed that the oracle had promised them victory provided they did not kill the king of the Athenians, came immediately to a resolution of dying for his country. Disguising himself, therefore, like a peasant, he went into the enemy's camp, and, quarrelling with some of the soldiers, was killed by them. On the morrow, the Athenians knowing what was done, sent to demand the body of their king; at which the invaders were so terrified, that they decamped without striking a blow.

Upon the death of Codrus, a dispute which happened among his sons concerning the succession, furnished the Athenians with a pretence for ridding themselves of their kings altogether, and changing the monarchical form of government into a republican one. It was improbable, they said, that they should ever have so good a king as Codrus; and to prevent their having a worse, they resolved to have no king but Jupiter. That they might not, however, seem ungrateful to the family of Codrus, they made his son Medon their supreme magistrate, with the title of *archon*. They afterwards rendered that office decennial, but continued it still in the family of Codrus. The extinction of the Medontidæ at last left them without restraint; upon which they not only made this office annual, but created nine archons. By the latter invention they provided against the too great power of a single person, as by the former they took away all apprehension of the archons having time to establish themselves, so as to change the constitution. In a word, they now attained what they had long sought, viz. the making the supreme magistrates dependent on the people.

We have a list of these archons, for upwards of 600 years, beginning with Creon, who lived about 684 years before Christ, to Herodes, who lived only 60 years before that time. The first archon of whom we hear any thing worth notice, is named *Draco*. He reigned in the second, or, as others say, in the last year of the 39th Olympiad, when, it is supposed, he published his laws: but though his name is very frequently mentioned in history, yet no connected account can be found either of him, or his institutions; only, in general, his laws were exceedingly severe, inflicting death for the smallest faults; which gave occasion to one Demades an orator to observe, that the laws of Draco were written with blood, and not with ink. For this extraordinary severity he gave no other reason, than that small faults seemed to him to be worthy of death, and he could find no higher punishment for the greatest. He was far advanced in years when he gave laws to Athens; and to give his institutions the greater weight, he would not suffer them to be called *nomoi*, or laws, but *thesmoi*, or sanctions proceeding from more than human wisdom. The extreme severity of these laws, however, soon made the Athenians weary both of them and the author of them; upon which Draco was obliged to retire to Ægina. Here he was received with the highest honours: but the favour of the inhabitants of this place proved more fatal to him than the hatred of the Athenians; for coming one day into the theatre, the audience, to shew their regard, threw, as the custom

then was, their cloaks upon him; and the multitude of these being very great, they stifled the old man, who was too weak to disengage himself from their load.

After the expulsion of Draco, nothing equally remarkable happened at Athens till the year before Christ 606, when we find the republic engaged in a war with the Mitylenians about the city Sigæum, situated near the mouth of the river Scamander. The Athenian army was commanded by Phrynon, a person equally remarkable for the comeliness of his person and the generosity of his mind. The Mitylenians were commanded by Pittacus, one of the celebrated sages of Greece. As these commanders looked upon the honour of their respective countries to be concerned, they exerted themselves to the utmost. At last they met in single combat: where Phrynon depended on his valour only; but Pittacus concealed behind his shield a net, wherewith he suddenly entangled his antagonist, and easily slew him. This, however, not putting an end to the war, Pericles tyrant of Corinth interposed; and both parties having submitted to his arbitration, he decreed that Sigæum should belong to the Athenians.

About seven years after this war, a conspiracy was formed by Cylon son-in-law to Theagenes tyrant of Megara, who, having by his assable behaviour procured many friends, formed a design of seizing the sovereignty of Athens. Having consulted the oracle as to the most proper time, he was directed to make the attempt when the citizens of Athens were employed in celebrating their highest feast to Jupiter. When many of the citizens, therefore, were gone to the Olympic games, Cylon and his associates made themselves masters of the citadel. Here they were instantly besieged by Megacles at that time archon, and soon reduced to great distress for want of water. The chief together with his brother found means to make their escape, but the meaner sort were left to starve for themselves. In this extremity they fled to the temple of Minerva, from whence Megacles with much ado prevailed upon them to come down and submit themselves to the mercy of their country. Having at last assented to this, they tied a cord to the image of the goddess, and carried the clue with them, to demonstrate that though they were out of the temple they were still under Minerva's protection. Unfortunately for them, however, as they passed the temple of the furies, the line snapt of itself, which Megacles construing into a renunciation by the goddess, caused his men fall upon them and dispatch as many as they could find. Such as were without the temple, were immediately massacred, and those who fled thither again were murdered in their sanctuary. In short, none escaped but such as bribed the wives of the officers of justice. This carnage, however, did not put an end to the sedition. The remains of Cylon's faction created great disturbances, by insinuating that the violation of Minerva's sanctuary had drawn down the anger of the gods; and these discourses had such an effect, that Megacles and his officers were styled *execrable*, and held to be persons under the displeasure of Heaven.

During the time of this confusion, the Megarensians attacked Nisea, which they took, as well as Salamis; and so completely routed the Athenians in every attempt to recover the latter, that a law was at last passed by which it should be capital for any one to propose the recovery of Salamis. About the same time

Attica.
30
His death.

31
Mitylenian war.

32
Cylon's conspiracy.

33
Conspirators massacred by Megacles.

34
Who is executed by the people.

35
Unsuccessful war with Megara.

Attics.

the city was disturbed by reports of frightful appearances, and filled with superstitious fears; the oracle at Delphi was therefore consulted, and an answer returned that the city behaved to be expiated. Upon this, Epimenides the Phestian was sent for from Crete, to perform the necessary ceremonies, he being reputed an holy man, and one that was deeply skilled in all the mysteries of religion. His expiation consisted in taking some black, and some white sheep, turning them all loose, and directing some persons to follow them to those places where they couched, and there to sacrifice them to the local deity. He caused also many temples and chapels to be erected, two of which have been particularly noted, viz. the chapel of *Contumely*, and that of *Impudence*. This man is said to have looked wistfully on the port of Munychia for a long time, and then to have spoke as follows to those that were near him. "How blind is man to future things? for did the Athenians know what mischief will one day be derived to them from this place, they would eat it with their teeth." This prediction was thought to be accomplished 270 years after, when Antipater constrained the Athenians to admit a Macedonian garrison into that place.

36
Epimenides's exortation and prophecy.

37
Solon the wise legislator.

About 597 years before Christ, Solon the famed Athenian legislator began to shew himself to his countrymen. He is said to have been linally descended from Codrus; but left by his father in circumstances rather necessitous, which obliged him to apply to merchandize: it is plain, however, both from his words and writings, that he was a disinterested patriot. The shameful decree, that none under pain of death should propose the recovery of Salamis, grieved him so much, that having composed an elegy of 100 verses, such as he thought would be most proper to inflame the minds of the people, he ran into the market-place as if he had been mad, with his night-cap on his head, repeating his elegy. A crowd being gathered round the pretended madman, his kinsman Pisistratus mingled among the rest, and observing the people moved with Solon's words, he also seconded him with all the eloquence he was master of, and between them they prevailed so far as to have the law repealed, and a war was immediately commenced against the people of Megara. Who was commander in this expedition is not certain; but the city was recovered, according to the most general account, by the following stratagem. Solon coming with Pisistratus to Colias, and finding there the women busy in celebrating, according to custom, the feast of Ceres, sent a confidant of his to Salamis, who pretended to be no friend to the people of Attica, telling the inhabitants of Salamis, that if they had a mind to seize the fairest of the Athenian ladies, they might now do it by passing over to Colias. The Megarensians giving easy credit to what the man said, immediately fitted out a ship; which Solon perceiving from the opposite shore, dismissed the women, and having dressed a number of beardless youths in female habits, under which they concealed every one a dagger, he sent them to the sea-side to dance and divert themselves as the women were wont to do. When those who came from Salamis saw these young persons skipping up and down, they strove who should be first on shore; but were every one of them killed, and their vessel seized; aboard which the Athenians embarking, sailed immediately to Sa-

39
Salamis recovered by his means.

lami, and took it.

On the return of Solon to Athens, he was greatly honoured by the people, to whom another occasion of admiring his wisdom was quickly afforded. The inhabitants of Cirrha, a town situated in the bay of Corinth, after having by repeated incursions wasted the territory of Delphi, at last besieged the capital itself, with a view of making themselves masters of the treasures contained in the temple of Apollo. Advice of this intended sacrilege being sent to the Amphictyons, who were the states-general of Greece, Solon advised that the matter should be universally referred, and that all the states should join in punishing the Cirrheans, and saving the Delphic oracle. This advice was complied with, and a general war against Cirrha declared. Clisthenes, tyrant of Sicyon, commanded in chief, and Alcmaeon was general of the Athenian quota. Solon went as assistant or counsellor to Clisthenes, and by following his advice the war was conducted to a prosperous issue. For when the Greek army had besieged Cirrha for some time without any appearance of success, the oracle at Delphi was consulted, from whence the following answer was returned:

"In vain you hope to take the place before

"The sea's blue waves roll o'er the hallow'd shore."

This answer struck the whole army with surprise, till Solon advised Clisthenes to consecrate solemnly the whole territory of Cirrha to the Delphic Apollo; so, as that was a maritime country, the sea must then wash the sacred coast. According to Pausanias, the city was reduced by the following stratagem, likewise invented by Solon. He caused the river Plisus, which run through Cirrha, to be turned into another channel, hoping thereby to have distressed the inhabitants for want of water; but finding they had many wells within the city, and were not to be reduced by that means, he caused a vast quantity of roots of hellebore to be thrown into the river, which was then suffered to return into its former bed. The inhabitants, overjoyed at the sight of running water, came in troops to drink of it; whereupon an epidemic flux ensued, and the citizens being no longer able to defend the walls, the town was easily taken.

On the return of Solon to Athens he found things again in the utmost confusion. The remnant of Cylon's faction gave out, that all sorts of misfortunes had befallen the republic on account of the impety of Megacles and his followers, which clamour was heightened by the retaking of Salamis about this time by the Megarensians. Solon interposed, and persuaded those who were styled *execrable* to abide a trial, and 300 persons were chosen to judge them. The event was, that 300 of Megacles's party who were alive were sent into perpetual banishment, and the bones of such as were dead were dug up and sent without the limits of their country.

Though this decision restored the public quiet for the present, it was not long before the people were divided into three factions contending about the proper form of government. These were called the *Diacrii*, *Pedarii*, and *Parali*: the first of these were the inhabitants of the hilly country, who declared positively for democracy; the second, dwelling in the lower parts, and who were far more opulent than the former, declared for an oligarchy, as supposing the government would

Cirrha
wars
duel
Solon
do

Athens
greater
suffer

Megara
party
nothing

Three
parties
up.

fall

fall mostly into their hands ; the third party, who lived on the sea-coast, were people of moderate principles, and therefore were for a mixed government. Besides the disturbances raised on this account, others were occasioned by the rich oppressing the poor. According to Plutarch, the poor being indebted to the rich, either tilled their grounds, and paid them the sixth part of the produce, or engaged their bodies for their debts, so that many were made slaves at home, and many sold into other countries ; nay, some were obliged to sell their children to pay their debts, and others in despair quitted Attica altogether. The greatest part, however, were for throwing off the yoke, and began to look about for a leader, openly declaring that they intended to change the form of government, and make a repartition of lands. In this extremity, the eyes of all the citizens were cast upon Solon. The most prudent were for offering him the sovereignty ; but he perceiving their intentions, behaved in such a manner as to cheat both parties, and shewed a spirit of patriotism perhaps never equalled. He refused the sovereignty as far as it might have benefited himself ; and yet took upon himself all the care and trouble of a prince, for the sake of his people.

He was chosen archon without having recourse to lots, and after his election disappointed the hopes of both parties. It was Solon's fundamental maxim, That those laws will be best observed which power and justice equally support. Wherever, therefore, he found the old constitution consonant to justice in any tolerable degree, he refused to make any alteration at all, and was at extraordinary pains to shew the reason of the changes he did make. In short, being a perfect judge of human nature, he fought to rule, only by shewing his subjects that it was their interest to obey, and not by forcing upon them what he himself esteemed best. Therefore, to a person who asked whether he had given the Athenians the best laws in his power, he replied, " I have established the best they could receive."

As to the main cause of sedition, viz. the oppressed state of the meaner sort, Solon removed it by a contrivance which he called *sisachthia*, i. e. *discharge* ; but what this was, authors are not agreed upon. Some say that he released all debts then in being, and prohibited the taking any man's person for payment of a debt for the future. According to others, the poor were eased, not by cancelling the debts, but by lowering the interest, and increasing the value of money ; a mina, which before was made equal to 73 drachms only, being by him made equal to 100 ; which was of great advantage to the debtor, and did the creditor no hurt. It is, however, most probable that the *sisachthia* was a general remittance of all debts whatever, otherwise Solon could not have boasted in his verses that he had removed so many marks of mortgages (a) as were every where frequent ; that he had freed from apprehension such as were driven to despair, &c.

But in the midst of all Solon's glory, an accident befel him, which, for a time, hurt his reputation, and had almost entirely ruined his schemes. He had consulted Conon, Clinias, and Hipponicus, his three friends, on an oration prepared with a view to engage

the people's consent to the discharge ; and these three men, thus knowing there was to be a general discharge of debts, safely took the opportunity of borrowing vast sums before the law was promulgated, in consequence of which they were never obliged to return them.

This was thought at first to have been done with Solon's consent, and that he had shared in the money ; but this aspersion was quickly wiped off when it appeared that the lawgiver himself was a very considerable loser by his own law. His friends, however, could never recover their credit, but were ever afterwards stigmatized with the opprobrious appellation of *chreocopides*, or *debt-finders*.

The Athenians were as little pleased with Solon's management as with their former condition ; the rich thinking he had done too much in cancelling the money-debts due to them, and the poor that he had done too little because he had not divided the lands of Attica equally. In a short time, however, they acquiesced in the new institutions, and gave a more public token of their repentance than they had before shewn of their displeasure, instituting a solemn sacrifice under the name of *Sisachthia*, at the same time that Solon was unanimously elected legislator of Athens, with full power to make laws, and alter or new model the constitution as he thought fit.

Solon being now invested with unlimited authority, set about the arduous task of compiling new laws for the turbulent people of Attica ; which having at last completed in the best manner he was able, or in the best manner the nature of the people would admit, he procured them to be ratified for 100 years. Such as related to private actions were preserved on parallelograms of wood, with cases which reached from the ground, and turned about upon a pin like a wheel. These were thence called *Axones* ; and were placed first in the citadel, and afterwards in the prytaneum, that all the subjects might have access to them when they pleased. Such as concerned public institutions and sacrifices were contained in triangular tables of stone called *cyrbes*. The Athenian magistrates were sworn to observe both ; and in process of time these monuments of Solon's wisdom became so famous, that all public acts were from them named *Axones* and *Cyrber*.

After the promulgation of the laws, Solon found himself obliged to leave Athens, to prevent his being continually teased for explanations and alterations of them. He therefore pretended an inclination to merchandise, and obtained leave to absent himself for 10 years, during which time he hoped the laws would be grown familiar. From Athens Solon travelled into Egypt, where he conversed with Psenophis the Heliopolitan, and Sonchis the Saite, the most learned priests of that age. From thence he learned the situation of the island Atlantis, of which he wrote an account in verse, which Plato afterwards continued *. From Egypt he went to Cyprus, where he was extremely well received by one of the petty kings. This prince lived in a city called *Apeia*, built by Demophon the son of Theus, on an eminence near the river Clarius, but in a soil craggy and barren. Solon observing a very pleasant plain below, engaged the king to remove thither ; assisted in executing the scheme he had formed ;

At the

46
Solon blamed at first but afterwards applauded and chosen legislator.

47
Compiles a new body of laws.

48
He goes abroad for 10 years.

* See Atlantis.

(a) The Athenians had a custom of hanging up billets to shew that houses were engaged for such and such sums of money.

Atties.

formed; and succeeded so well, that a new city was formed which soon became populous, and out of gratitude to the Athenian legislator was called *Solon*.

49
Things fall
into disorder in his
absence.

But while Solon was thus travelling in quest of wisdom, and with a view to benefit those among whom he came, his countrymen, who seem to have resolved on being dissatisfied at all events, had again divided themselves into three factions. Lycurgus put himself at the head of the country people; Megacles the son of Alcæmon was at the head of those who lived on the sea-coast; and Pisistratus put himself at the head of the poorer sort, to protect them, as he pretended, from tyranny, but in reality to seize on the sovereignty for himself. All the factions pretended to have a vast regard for Solon and his laws, at the same time that they were very desirous of a change; but how they were to be bettered, none of them knew, or pretended to know.

50
He returns
to Athens,
but refuses
to resume
his office.

In the midst of this confusion the legislator returned. Each of the factions paid their court to him, and affected to receive him with the deepest reverence and respect; beseeching him to reassume his authority, and compose the disorders which they themselves kept up. This Solon declined on account of his age, which, he said, rendered him unable to speak and act for the good of his country as formerly: however, he sent for the chiefs of each party, beseeching them in the most pathetic manner not to ruin their common parent, but to prefer the public good to their own private interest.

Pisistratus, who of all the three had perhaps the least intention to follow Solon's advice, seemed to be the most affected with his discourses; but as Solon perceived he affected popularity by all possible methods, he easily penetrated into his designs of assuming the sovereign power. This he spoke of to Pisistratus himself, at first privately; but as he saw that his admonitions in this way had no effect, he then said the same things to others, that the public might be on their guard against him.

51
Pisistratus
assumes the
sovereignty.

All the wise discourses of Solon, however, were lost upon the Athenians. Pisistratus had got the meaner sort entirely at his devotion, and therefore resolved to cheat them out of the liberty which they certainly deserved to lose. With this view he wounded himself, and, as Herodotus says, the mules that drew his chariot; then he drove into the market-place, and there shewed his bleeding body, imploring the protection of the people from those whom his kindness to them had rendered his implacable enemies. A concourse of people being instantly formed, Solon came among the rest, and, suspecting the deceit, openly taxed Pisistratus with his perfidious conduct; but to no purpose. A general assembly of the people was called, wherein it was moved by one Ariston, that Pisistratus should have a guard. Solon was the only person present who had resolution enough to oppose this measure; the richer Athenians, perceiving that the multitude implicitly followed Pisistratus, and applauded every thing he said, remaining silent through fear. Solon himself, when he saw he could prevail nothing, left the assembly, saying he was *wiser* than some, and *fooler* than others. A guard of 400 men was now unanimously decreed to Pisistratus, as we are told by Solon himself. This inconsiderable body he made use of to enslave the people, but in what manner he accomplished his purpose is not agreed.

Certain it is, that with his sword he seized the citadel; but Polyænus hath given an account of a very singular method which he took to put it out of the power of the Athenians to defend themselves even against such a small number. He summoned an assembly to be held at the Anacium, and directed that the people should come thither armed. They accordingly came; and Pisistratus harangued them, but in a voice so low that they could not tell what he said. The people complaining of this, Pisistratus told them that they were hindered from hearing him by the clangor of their arms; but, if they would lay them down in the portico, he would then be heard distinctly. This they did; and while they listened very attentively to a long and eloquent oration, Pisistratus's guard conveyed away their arms, so that they found themselves deprived of all power of resistance. During the confusion which followed this event, another assembly was held, wherein Solon inveighed bitterly against the meanness of his countrymen, inviting them to take up arms in defence of their liberty. When he saw that nothing would do, he laid down his own arms, saying, that he had done his utmost for his country and his laws. According to Plutarch, he refused to quit the city; but the most probable opinion is, that he immediately retired from the dominions of Athens, and refused to return, even at the solicitation of Pisistratus himself.

52
Solon left
Athens.

Pisistratus, having thus obtained the sovereignty, did not overturn the laws of Solon, but used his power with the greatest moderation. It is not to be expected, however, that so turbulent a people as the Athenians could be satisfied by any method of government he could lay down. At the beginning of his administration, Megacles and his family retired out of Athens to save their own lives, yet without despairing of being able some time or other to return. With this view Megacles and his associates entered into a treaty with Lycurgus; and having brought him and his party into a scheme for deposing Pisistratus, they concerted matters so well, that Pisistratus was soon obliged to seek for shelter somewhere else, and, on his departure, the Athenians ordered his goods to be sold. Nobody, however, except one person (*Callias*), would venture to buy any of them, from an apprehension, no doubt, that they would soon be restored to their proper owner, which accordingly happened in a very short time.

53
Pisistratus
governs
with great
moderation.

54
Driven out
by Megacles.

As Megacles and his party had negotiated with Lycurgus to turn out Pisistratus, so they now entered into a treaty with Pisistratus to reinstate him in his principality, as soon as they found Lycurgus would not be implicitly governed by them. To accomplish this, they fell upon a very ridiculous project; which, however, was attended with the desired success. They found out a woman whose name was *Phya*, of a mean family and fortune, but of a great stature, and very handsome. Her they dressed in armour, placed her in a chariot, and having disposed things so as to make her appear with all possible advantage, they conducted her towards the city, sending heralds before, with orders to speak to the people in the following terms; "Give a kind reception, O Athenians, to Pisistratus, who is so much honoured by Minerva above all other men, that she herself condescends to bring him back to the citadel." The report being universally spread that Minerva was bringing home Pisistratus, and the ignorant multitude

55
Who soon
after rein-
states him.

believing

Attica.

Believing this woman to be the goddess, addressed their prayers to her, and received Pisistratus with the utmost joy. When he had recovered the sovereignty, Pisistratus married the daughter of Megacles as he had promised, and gave the pretended goddess to his son Hipparchus.

56
given out
second
me.

Pisistratus did not long enjoy the kingdom to which he had been restored in so strange a manner. He had married the daughter of Megacles, as already observed; but having children by a former wife, and remembering that the whole family of Megacles was reprobated by the Athenians, he thought proper to let his new spouse remain in a state of perpetual widowhood. This she patiently bore for some time, but at last acquainted her mother. An affront so grievous could not fail to be highly resented. Megacles instantly entered into a treaty with the malcontents, of whom there were always great plenty at Athens whatever was the form of government. This Pisistratus being apprized of, and perceiving a new storm gathering, he voluntarily quitted Athens, and retired to Eretria. Here having consulted with his sons, it was resolved to reduce Athens by force. With this view he applied to several of the Greek states, who furnished him with the troops he desired, but the Thebans exceeded all the rest in their liberality; and with this army he returned to Attica, according to Herodotus, in the 11th year of his banishment. They first reduced Marathon, the inhabitants of which had taken no measures for their defence, tho' they knew that Pisistratus was preparing to attack them. The republican forces in the mean time marched out of Athens to attack him; but behaving in a secure and careless manner, they were surprised by Pisistratus, and totally routed. While they were endeavouring to make their escape, he caused his two sons ride before him with all speed, and tell those they came up with that nobody had any thing to fear, but that they might every one return to his own home. This stratagem so effectually dispersed the republican army, that it was impossible to rally them, and Pisistratus became a third time absolute master of Attica.

57
it returns
sh an
my.

58
takes
possession of
city.

59
subjects
discon-
ted not-
hildand-
his mo-
tation.

Pisistratus being once more in possession of the sovereignty, took a method of establishing himself on the throne directly opposite to what Theseus had done. Instead of collecting the inhabitants from the country into cities, as Theseus had done, Pisistratus made them retire from the cities into the country, in order to apply themselves to agriculture. This prevented their meeting together, and caballing against him in such bodies as they had been accustomed to do. By this means also the territory of Athens was greatly meliorated, and great plantations of olives were made over all Attica, which had before not only been destitute of corn, but also bare of trees. He also commanded, that, in the city, men should wear a kind of sheep-skin vest, reaching to the knees; but so intolerable were the laws of Pisistratus to his subjects, that this kind of garment in succeeding times became proverbially the habit of slavery.

As prince of Athens, Pisistratus received the tenth part of every man's revenues, and even of the fruits of the earth; and this also, though for the service of the state, seemed to the Athenians a most grievous burden. In short, though Pisistratus behaved in all respects as a most excellent prince, his subjects fancied

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themselves oppressed by tyranny, and were perpetually grumbling from the time he first ascended the throne to the day of his death, which happened about 33 years after he had first assumed the sovereignty, of which time, according to Aristotle, he reigned 17 years.

Pisistratus left behind him two sons named Hipparchus and Hippias, both men of great abilities, who shared the government between them, and behaved with lenity and moderation. But though by the mildness of their government the family of the Pisistratide seemed to be fully established on the throne of Athens, a conspiracy was unexpectedly formed against both the brothers, by which Hipparchus was taken off, and Hippias narrowly escaped. The most material facts relating to this conspiracy are what follow.

Attica.

60
Hipparchus
and Hip-
pias.

There were at that time in Athens two young men called *Harmodius* and *Aristogiton*; the former of these was exquisitely beautiful in his person, and on that account, according to the infamous custom of the Greeks, violently beloved of the other. This Harmodius was also beloved of Hipparchus; who, if we may believe Thucydides, forced him. This was grievously resented, and revenge determined on; to hasten which, another accident concurred. Hipparchus, finding that Harmodius endeavoured to avoid him, publicly affronted him, by not suffering his sister to carry the offering of Minerva, as if she was a person unworthy of that office. The two young men, not daring to shew any public signs of resentment, consulted privately with their friends; among whom it was resolved, that at the approaching festival of Panathenæa, when the citizens were allowed to appear in arms, they should attempt to restore Athens to its former liberty. In this they imagined that they should find themselves seconded by the whole body of the people. But when the day appointed was come, they perceived one of their number talking very familiarly with Hippias; and fearing that they were discovered, they immediately fell upon Hipparchus, and dispatched him with a multitude of wounds. In this exploit the people were so far from seconding them, as they expected, that they suffered Harmodius to be killed by Hipparchus's guards, and seizing Aristogiton themselves delivered him up to Hippias. Some time afterwards, however, the respect they paid to these two young men exceeded all bounds. They caused their praises to be sung at the Panathenæa, forbid any citizen to call a slave by either of their names, and erected brazen statues to them in the forum; which statues were afterwards carried into Persia by Xerxes, and sent back from thence by Alexander the Great, Antiochus, or Seleucus, for authors are not agreed by which. Several immunities and privileges were also granted to the descendants of these two patriots, and all possible means were taken to render their memory venerable and respected by posterity.

61
Conspiracy
of Harmo-
dius and A-
ristogiton.

62
Hipparchus
killed.

63
The conspira-
tors extraor-
dinarily
honoured.

64
Cruelty of
Hippias.

Hippias being now sole master of Athens, and probably exasperated by the murder of his brother, began to alter his conduct greatly, and treat his subjects in an oppressive and cruel manner. He began with torturing Aristogiton, in order to make him confess his accomplices; but this proved fatal to his own friends; for Aristogiton impeaching such as he knew to be best affected to Hippias, they were immediately put to death; and when he had destroyed all those he knew, at last told Hippias, that now he knew of none that deserved

5 S

to

to suffer death except the tyrant himself. Hippias next vented his rage on a woman named *Leena*, who was kept by Aristogiton. She endured the torture as long as she could; but finding herself unable to bear it any longer, she at last bit off her tongue, that she might not have it in her power to make any discovery. To her the Athenians erected the statue of a lioness, alluding to her name, without a tongue, on which was engraved a suitable inscription.

After the conspiracy was, as Hippias thought, thoroughly quashed, he set himself about strengthening his government by all the means he could think of. He contracted leagues with foreign princes, increased his revenues by various methods, &c. But these precautions were of little avail: the lenity of Pisistratus's government had alone supported it; and Hippias pursuing contrary methods, was deprived of the sovereignty in less than four years after the death of his brother.

65
He is driven
out of A-
thens,

This revolution was likewise owing to the family of Megacles, who were styled *Alcemonide*, and had settled at Lipydrum. In times of discontent, which at Athens were very frequent, this family was the common refuge of all who fled from that city; and at last they thought of a method of expelling the Pisistratidæ altogether. The method they took to accomplish their purpose was as follows. They agreed with the Amphictyons to rebuild the temple at Delphi; and being possessed of immense riches, they performed their engagement in a much more magnificent manner than they were bound to do; for having agreed only to build the front of common stone, they built it of Parian marble. At the same time they corrupted the prophetess Pythia, engaging her to exhort all the Lacedæmonians that came to consult the oracle either in behalf of the state, or their own private affairs, to attempt the delivery of Athens. This had the desired effect: the Lacedæmonians, surpris'd at hearing this admonition incessantly repeated, at last resolv'd to obey the divine command, as they imagin'd it to be; and sent Anchimolius, a man of great quality, at the head of an army into Attica, though they were at that time in league with Hippias, and account'd by him his good friends and allies. Hippias demanding assistance from the Thessalians, they readily sent him 1000 horse, under the command of one of their princes named *Cineas*. The Lacedæmonians being landed, Hippias fell upon them so suddenly, that he defeated them with great slaughter, killed their general, and forced the shattered remains of their army to fly to their ships. The Spartans, incens'd at this unfortunate expedition, determin'd to send another army into Attica, which they accordingly did soon after under their king Cleomenes; and he having, at his entrance into the Athenian territories, defeated the Thessalian horse, oblig'd Hippias to shut himself up in the city of Athens, which he was soon after forced to abandon altogether. He was, however, in no want of a place of refuge; the Thessalian princes inviting him into their country, and the king of Macedon offering his family a city and territory, if they chose to retire into his dominions. But Hippias chose rather to go to the city of Sigeum, which Pisistratus had conquered, and left to his own family.

66
And retires
to Sigeum.

After the expulsion of the Pisistratidæ, the Athenians did not long enjoy the quiet they had propos'd to themselves. They were quickly divided into two fac-

tions; at the head of one was Clytheus, one of the chief of the Alcemonidæ; and of the other, Isagoras, a man of great quality, and highly in favour with the Athenian nobility. Clytheus apply'd himself to the people, and endeavour'd to gain their affection by increasing their power as much as possible. Isagoras perceiving that by this means his rival would get the better, apply'd to the Lacedæmonians for assistance, reviving at the same time the old story of Megacles's sacrilege, and insinuating that Clytheus ought to be banish'd as being of the family of Megacles. Cleomenes king of Sparta readily came into his measures, and suddenly dispatch'd an herald to Athens with a declaration of war in case all the Alcemonidæ were not immediately banish'd. The Athenians did not hesitate to banish their benefactor Clytheus, and all his relations; but this piece of ingratitude did not answer their purpose. Cleomenes enter'd Attica at the head of a Spartan army; and, arriving at Athens, condemn'd to banishment 700 families more than what had been sent into exile before. Not content with this, he would have dissolv'd the senate, and vest'd the government in 300 of the chief of Isagoras's faction. This the Athenians would by no means submit to; and therefore took up arms, and drove Cleomenes and his troops into the citadel, where they were besieged for two days. On the third day Cleomenes surrendred, on condition that all those who were in the citadel should retire unmolested. This, though agreed to, was not performed by the Athenians. They fell upon such as were separated from the army, and put them to death without mercy. Among the number of those slain on this occasion was Timestheus the brother of Cleomenes himself.

The Spartan king was no sooner withdrawn from Athens, than he form'd a strong combination in favour of Isagoras. He engag'd the Boeotians to attack Attica on the one side, and the Chalcidians on the other, while he at the head of a powerful Spartan army enter'd the territories of Eleusina. In this distress, the Athenians, not being able to cope with so many enemies at once, resolv'd to suffer their territories to be ravag'd by the Chalcidians and Boeotians, contenting themselves with opposing the army command'd by Cleomenes in person. But this powerful confederacy was quickly dissolv'd: the Corinthians, who were allied with Cleomenes, doubting the justice of their cause, return'd home; his other allies likewise beginning to waver, and his colleague Ariston, the other king of Sparta, differing in sentiments, Cleomenes was oblig'd to abandon the enterprise. The Spartans and their allies being withdrawn, the Athenians took a severe revenge of the Boeotians and Chalcidians, totally routing their forces, and carrying off a great number of prisoners. The prisoners taken in this war were put in irons, but afterwards set at liberty on paying a ransom of two minæ per head. Their fetters were, however, hung up in the citadel; and the Athenians consecrating the tenth of what they had received for ransom, purchased a statue representing a chariot and four horses, which they set up in the portico of the citadel, with a triumphant inscription in token of their victory.

These indignities rous'd the Boeotians, they immediately vow'd revenge, and engag'd on their side the people of Ægina, who had an hereditary hatred at the Athenians; and while the latter bent all

their

67
Two fac-
tions in A-
thens.

68
The Spar-
tans suppo-
se Isagoras,

69
But without
success.

70
Boeotians
and Chalci-
dians de-
feated.

Attica. their attention to the Bœotian war, the Æginetans landing a considerable army ravaged the coasts of Attica.

75
Attempt of
the Spar-
tans to re-
store Hip-
pias.
But while the Athenians were thus employed against the Bœotians and Æginetans, a jealousy sprung up on the part of Lacedæmon, which was never afterwards eradicated. Cleomenes, after his unsuccessful expedition against Attica, produced at Sparta certain oracles which he said he had found in the citadel of Athens while he was besieged therein: the purport of these oracles was, that Athens would in time become a rival to Sparta. At the same time it was discovered, that Clysthenes had bribed the priests of Apollo to cause the Lacedæmonians expell the Pisistratidæ from Athens; which was sacrificing their best friends to those whom interest obliged to be their enemies. This had such an effect, that the Spartans, repenting their folly in expelling Hippias, sent for him from Sigeum, in order to restore him to his principality: but this not being agreed to by the rest of the states, they were forced to abandon the enterprise, and Hippias returned to Sigeum as he came.

72
Cause of the
war with
Persia.
About this time too, Aristagoras the Milesian, having set on foot a revolt in Ionia against the Persian king, applied to the Spartans for assistance; but they declining to have any hand in the matter, he next applied to the Athenians, and was by them furnished with 20 ships under the command of Melanthus, a nobleman universally esteemed. This rash action cost the Greeks very dear, as it brought upon them the whole power of the Persian empire; for no sooner did the king of Persia hear of the assistance sent from Athens to his rebellious subjects, than he declared himself the sworn enemy of that city, and solemnly besought God that he might one day have it in his power to be revenged on them.

The Ionian war being ended, by the reduction of that country again under the Persian government, the king of Persia sent to demand earth and water as tokens of submission from the Greeks. Most of the islanders yielded to this command out of fear, and among the rest the people of Ægina; upon which the Athenians accused the inhabitants of this island of treachery towards Greece, and a war was carried on with them for a long time. How it ended we are not informed; but its continuance was fortunate for Greece in general, as, by insuring them to war, and sea-affairs in particular, it prevented the whole of the Grecian states from being swallowed up by the Persians who were now about to invade them.

Besides the displeasure which Darius had conceived against the Athenians on account of the assistance they had afforded the Ionians, he was farther urged to an expedition against Greece by the intrigues of Hippias. Immediately on his returning unsuccessfully from Lacedæmon, as above related, Hippias passed over into Asia, went to Artaphernes governor of the adjacent provinces belonging to the Persian king, and excited him to make war upon his country, promising to be obedient to the Persian monarch provided he was restored to the principality of Athens. Of this the Athenians being apprized, sent ambassadors to Artaphernes, desiring leave to enjoy their liberty in quiet: but that nobleman returned for answer, that if they would have peace with the great king, they must

immediately receive Hippias; upon which answer, the Athenians resolved to assist the enemies of Darius as much as possible. The consequence of this resolution was, that Darius commissioned Mardonius to revenge him of the insults he thought the Greeks had offered him. But Mardonius having met with a storm at sea, and other accidents, which rendered him unable to do any thing, Datis, and Artaphernes the son of Artaphernes abovementioned, were commissioned to do what he was to have done.

The Persian commanders, fearing again to attempt 74
to double the promontory of Athos, where their fleet had formerly suffered, drew their forces into the plains of Cilicia; and passing from thence through the Cyclades to Eubœa, directed their course to Athens. Their charge from Darius was to destroy both Eretria and Athens; and to bring away the inhabitants, that they might be at his disposal. Their first attempt was 75
on Eretria, the inhabitants of which sent to Athens for assistance on the first approach of the Persian fleet. The Athenians, with a magnanimity almost unparalleled at such a juncture, sent 4000 men to their assistance; but the Eretrians were so much divided among themselves, that nothing could be resolved on. One party among them was for receiving the Athenian succours into the city; another, for abandoning the city and retiring into the mountains of Eubœa; while a third sought to betray their country to the Persians for their own private interest. Seeing things in this situation, therefore, and that no good could possibly be done, one Æschines, a man of great authority among the Eretrians, generously informed the Athenian commanders that they might return home. They accordingly retired to Oropus, by which means they escaped destruction: for Eretria being soon after betrayed to the Persians, was pillaged, burnt, and its inhabitants sold for slaves.

On the news of this disaster the Athenians immediately drew together all the forces they were able, which after all amounted to no more than 9000 men. These, with 1000 Platæans, who afterwards joined them, were commanded by ten general officers, who had equal power; among whom were Miltiades, Aristides, and Themistocles, men of distinguished valour and great abilities. But it being generally imagined that so small a body of troops would be unable to resist the formidable power of the Persians, a messenger was dispatched to Sparta to intreat the immediate assistance of that state. He communicated his business to the senate in the following terms. "Men of Lacedæmon, the Athenians desire you to assist them, and not to suffer the most ancient of all the Grecian cities to be enslaved by the barbarians. Eretria is already destroyed, and Greece consequently weakened by the loss of so considerable a place." The assistance was readily granted; but at the same time the succours arrived so slowly, that the Athenians were forced to fight without them. In this memorable engagement in the plains of Marathon, whither Hippias had conducted the Persians, the latter were defeated with the loss of 6300 men, while the Greeks lost only 192. The Persians being thus driven to their ships, endeavoured to double Cape Sunium, in order to surprize Athens itself, before the army could return: but in this they were prevented by Miltiades; who, leaving Aristides with 1000 men to guard the prisoners, returned so expeditiously

Attica.

They in-
vade GreeceEretria de-
stroyed.76
Persians de-
feated at
Marathon.

Attica.

with the other 9000, that he was at the temple of Hercules, which was but a small way distant, before the barbarians could attack the city.

77
Integrity of
Aristides.

After the battle, Aristides discharged the trust reposed in him with the greatest integrity. Tho' there was much gold and silver in the Persian camp, and the tents and ships they had taken were filled with all sorts of riches, he not only forbore touching any thing himself, but to the utmost of his power prevented others from doing it. Some, however, found means to enrich themselves; among the rest, one Callias, cousin-german to Aristides himself. This man being a torch-bearer, and, in virtue of his office, having a fillet on his head, one of the Persians took him for a king, and, falling down at his feet, discovered to him a vast quantity of gold hid in a well. Callias not only seized, and applied it to his own use, but had the cruelty to kill the poor man who discovered it to him, that he might not mention it to others; by which infamous action he entailed on his posterity the name of *Laccopluti*, or enriched by the well.

78
Miltiades
ungrateful-
ly treated by
the Athe-
nians.

After the battle of Marathon, all the inhabitants of Platæa were declared free citizens of Athens, and Miltiades, Themistocles, and Aristides, were treated with all possible marks of gratitude and respect. This, however, was but very short-lived; Miltiades proposed an expedition against the island of Paros, in which having been unsuccessful, through what cause is not well known, he was, on his return, accused, and condemned to pay 50 talents, the whole expence of the scheme; and being unable to pay the debt was thrown into prison, where he soon died of a wound received at Paros.

79
As likewise
Aristides.

If any thing can exceed the enormity of such a proceeding as this, it was the treatment Aristides next received. Miltiades had proposed an expedition which had not proved successful, and in which he might possibly have had bad designs; but against Aristides not so much as a shadow of guilt was pretended. On the contrary, his extraordinary virtue had procured him the title of *Just*, and he had never been found to swerve from the maxims of equity. His downfall was occasioned by the intrigues of Themistocles; who being a man of great abilities, and hating Aristides on account of the character he deservedly bore among his countrymen, took all opportunities of insinuating that his rival had in fact made himself master of Athens without the parade of guards and royalty. "He gives laws to the people," said he; "and what constitutes a tyrant, but giving laws?" In consequence of this strange argument, a strong party was formed against the virtuous Aristides, and it was resolved to banish him for 10 years by the Ostracism. In this case, the name of the person to be banished was written upon a shell by every one who desired his exile, and carried to a certain place within the forum inclosed with rails. If the number of shells so collected exceeded 6000, the sentence was inflicted; if not, it was otherwise. When the agents of Themistocles had sufficiently accomplished their purpose, on a sudden the people flocked to the forum desiring the ostracism. One of the clowns who had come from a borough in the country, bringing a shell to Aristides, said to him, "Write me Aristides upon this." Aristides, surprised, asked him if he knew any ill of that Athenian, or if he had ever done him any hurt. "Me hurt! (said the fellow), no,

I don't so much as know him; but I am weary and sick at heart on hearing him every where called *the just*." Aristides therefore took the shell, and wrote his own name upon it; and when informed that the ostracism fell upon him, modestly retired out of the forum, saying, "I beseech the gods that the Athenians may never see that day which shall force them to remember Aristides."

Attica.

After the battle of Marathon, the war with Ægina was revived with great vigour; but the Æginetans generally had the superiority, on account of their great naval power. Themistocles observing this, was continually exhorting his countrymen to build a fleet, not only to make them an equal match for the Æginetans, but also because he was of opinion that the Persians would soon pay them another visit. At last, he had the boldness to propose, that the money produced by the silver mines, which the Athenians had hitherto divided among themselves, should be applied to the building of a fleet: which proposal being complied with, 100 galleys were immediately put upon the stocks; and this sudden increase of the maritime power proved the means of saving all Greece from slavery.

80
Them flocks
advices
the building
of a fleet.

About three years after the banishment of Aristides, Xerxes king of Persia sent to demand earth and water: but Themistocles desiring to make the breach with that monarch still wider, put to death the interpreter for publishing the decree of the king of Persia in the language of the Greeks; and having prevailed upon the several states to lay aside their animosities, and provide for their common safety, got himself elected general of the Athenian army.

81
Xerxes in-
vades
Greece.

When the news arrived that the Persians were advancing to invade Greece by the streights of Thermopylæ, and that they were for this purpose transporting their forces by sea, Themistocles advised his countrymen to quit the city, embark on board their galleys, and meet their enemies while yet at a distance. This they would by no means comply with; for which reason Themistocles put himself at the head of the army, and having joined the Lacedæmonians, marched towards Tempe. Here, having received advice that the straits of Thermopylæ were forced, and that both Boeotia and Thessaly had submitted to the Persians, the army returned without doing any thing.

In this distress the Athenians applied to the oracle at Delphi: from whence they received at first a very severe answer, threatening them with total destruction; but after much humiliation, a more favourable one was delivered, in which, probably by the direction of Themistocles, they were promised safety in *walls of wood*. This was by Themistocles and the greatest part of the citizens interpreted as a command to abandon Athens, and put all their hopes of safety in their fleet. Upon this, the opinion of Themistocles prevailing, the greatest part began to prepare for this embarkation; and had money distributed among them by the council of the Areopagus, to the amount of eight drachms per man: but this not proving sufficient, Themistocles gave out that somebody had stolen the shield of Minerva; under pretence of searching for which, he seized on all the money he could find. Some, however, there were who refused to embark with the rest, but raised to themselves fortifications of wood; understanding the oracle in its literal sense, and resolving to wait the arrival of the Persians,

82
Athens a-
bandoned
by its inha-
bitants.

Attica.

Perſians, and defend themſelves to the laſt. In the mean time Ariſtides was recalled, when the Athenians ſaw it their intereſt, leſt he ſhould have gone over to the Perſians and aſſiſted them with his advice.

83
d de-
by
Perſians.

84
y arco-
ty deſeat-
at Sala-

The Perſians having advanced to Athens ſoon after the inhabitants had deſerted it, met with no oppoſition except from the few juſt now mentioned; who, as they would hearken to no terms of accommodation, were all cut in pieces, and the city utterly deſtroyed. Xerxes, however, being defeated in a ſea-fight at Salamis, was forced to fly with prodigious loſs. Themisto- cles was for purſuing him, and breaking down the bridge he had caſt over the Hellespont; but this advice being rejected, he ſent a truſty meſſenger to Xerxes, acquainting him that the Greeks intended to break down his bridge, and therefore deſired him to make all the haſte he could, leſt by that means he ſhould be ſhut up in Europe. According to Herodotus, he alſo adviſed the Athenians to quit the purſuit and return home, in order to build their ruined houſes. This advice, tho' miſinterpreted by ſome, was certainly a very prudent one, as Xerxes, though once defeated, was ſtill at the head of an army capable of deſtroying all Greece; and had he been driven to deſpair by finding himſelf ſhut up, or warmly purſued, it was impoſſible to ſay what might have been the event. After this, Themisto- cles formed a ſcheme, for the aggrandizement of Athens indeed, but a moſt unjuſt and infamous one. It was, in ſhort, to make Athens miſtreſs of the ſea by burning all the ſhips except thoſe belonging to that republic. He told his countrymen that he had ſomething to propoſe of great conſequence, but which could not be ſpoken publicly: whereupon he was deſired to communicate it to Ariſtides, by whom the propoſal was rejected; and Ariſtides having informed the Athenians that what Themisto- cles had ſaid was very advantageous but very unjuſt, they deſired him to think no more of it.

85
miſto-
no-cour-
ty the
olamo-
n.

When the fleet returned to Salamis, extraordinary honours were paid to Themisto- cles by the Lacedæmonians. On his entering that city, they decreed him a wreath of olive, as the prize of prudence; preſented him with the moſt magnificent chariot in Sparta; and when he returned to Athens, he was eſcorted by 500 horſe, an honour never paid to any ſtranger but himſelf. On his arrival at Athens, however, there were not wanting ſome who inſinuated that the receiving ſuch honours from the Lacedæmonians was injurious to the republic; but Themisto- cles conſiding in his innocence, treated theſe clamours with contempt, and exhorted his countrymen to entertain no doubts of their allies, but rather endeavour to preſerve the great reputation they had acquired throughout all Greece.

86
s a
d time
byed.
87
Per-
deſeat-
at Platæa
Mycale

The defeat of Xerxes at Salamis made Mardonius, who was left to carry on the war by land, more ready to treat with the Athenians than to fight them; and with this view he ſent Alexander king of Macedonia to Athens to make propoſals of alliance with that republic, excluſively of all the other Grecian ſtates. This propoſal, however, was rejected; and the conſequence was, that Athens was a ſecond time deſtroyed, the Spartans ſending aſſiſtance ſo ſlowly, that the Athenians were forced to retire to Salamis: but they were ſoon freed from all apprehenſions by the total defeat and death of Mardonius at Platæa; where Ariſtides, and

the body of troops under his command, diſtinguiſhed themſelves in a moſt extraordinary manner.

Attica.

The ſame day that the battle of Platæa was fought, the Perſians were defeated in a ſea-fight at Mycale in Ionia, wherein it was allowed that the Athenians who were there behaved better than any of the other Greeks; but when it was propoſed to tranſport the Ionians into Europe, that they might be in perfect ſafety, and give them the territories of ſuch Grecian ſtates as had ſided with the Perſians, the Athenians reſuſed to comply, fearing the Ionians would rival them in trade, or reſuſe the obedience they uſed to pay them: beſides which, they would then loſe the opportunity of plundering the Perſians in caſe of any quarrel with Ionia. Before they returned home, however, the Athenians croſſed over to the Cherſoneſus, and beſieged Seſtos. The ſiege was long and troubleſome: but at laſt the gariſſon, being preſſed with hunger, and having no hopes of relief, divided themſelves into two bodies, and endeavoured to make their eſcape; but were purſued, and all either killed or taken. *Oihazus*, one of their commanders, was ſacrificed to a Thracian god; and the other, called *Artydactes*, impaled alive, and his ſon ſtoned before his face, becauſe he had riſed the ſepulchre of Proteſilaus.

88
Seſtos taken
by the Athe-
nians.

After the victories at Platæa and Mycale, the Athenians returned without any apprehenſion, and began to rebuild their city in a more magnificent manner than before. Here they were no ſooner arrived, than a diſpute was ready to be commenced about the form of government. The commons, with Themisto- cles at their head, were for a democracy; to which Ariſtides, rather than hazard the raiſing diſturbances, conſented. It was therefore propoſed, that every citizen ſhould have an equal right to the government; and that the archons ſhould be choſen out of the body of the people, without preference or diſtinction: and this propoſal being agreed to, put an end to all diſcontents for the preſent.

89
They re-
build their
city.

At this time alſo Themisto- cles propoſed that the city of Athens ſhould be fortified in the beſt manner poſſible, that it might not be liable to be again deſtroyed, when the Perſians ſhould take it into their heads to invade Greece. At this propoſal the Lacedæmonians were exceedingly alarmed; and therefore remonſtrated, that ſhould Athens once be ſtrongly fortified, and the Perſians become poſſeſſed of it, it would be impoſſible to get them out of it again. At laſt, ſeeing theſe arguments had no effect, they abſolutely forbid the Athenians to carry their walls any higher. This command gave great offence; but Themisto- cles, conſidering the power of Sparta at that time, adviſed the Athenians to temporize; and to aſſure the ambaffadors, that they ſhould proceed no farther in their work, till, by an embaffy of their own, ſatisfaction ſhould be given to their allies. Being named ambaffador at his own deſire to Sparta, with ſome other Athenians, Themisto- cles ſet out alone, telling the ſenate that it would be for the intereſt of the ſtate to delay ſending the other ambaffadors as long as poſſible. When arrived at Sparta, he put off from time to time receiving an audience, on account of his colleagues not being arrived: but in the mean time the walls of Athens were building with the utmoſt expedition; neither houſes nor ſepulchres being ſpared for materials; and men, women, children, ſtrangers, citizens, and ſervants, working without intermiſſion. Of this the Lacedæmonians having notice, and the reſt of the

90
Themisto-
cles adviſes
to fortify
Athens,
and deceives
the Spar-
tans who
oppoſe it.

the

Attica.

the Athenian ambassadors being arrived, Themistocles and his colleagues were summoned before the ephori, who immediately began to exclaim against the Athenians for their breach of promise. Themistocles denied the charge: he said his colleagues assured him of the contrary; that it did not become a great state to give heed to vague reports, but that deputies ought to be sent from Sparta to inquire into the truth of the matter, and that he himself would remain as a hostage, to be answerable for the event. This being agreed to, he engaged his associates to advise the Athenians to commit the Spartan ambassadors to safe custody, till he should be released; after which he publicly avowed the whole transaction, took the scheme upon himself, and told the Lacedæmonians that "all things are lawful for our country." The Spartans seeing no remedy, concealed their resentment, and sent Themistocles home in safety.

97
Makes the
Pyreum the
port of A-
thens.

The next year, being the last of the 75th Olympiad, Themistocles observing the inconvenience of the port Phalerum, thought of making the *Pyreum* the port of Athens. This he did not at first think proper to mention publicly; but having signified to the people that he had something of importance to communicate, they appointed Xanthippus and Aristides to judge of his proposal. They readily came into his measures, and told the people that what Themistocles proposed would be of the utmost advantage to the state, at the same time that it might be performed with ease. Upon this they were desired to lay the matter before the senate; who coming unanimously into their measure, ambassadors were dispatched to Sparta to insinuate there how proper it would be for the Greeks to have some great port, where a fleet might always watch the designs of the Persians; and thus having prevented any umbrage from their first undertakings, the work was set about with such expedition, that it was finished before the Lacedæmonians knew well what they were about.

95
Sovereignty
of the sea
transferred
to Athens.

At this time also the sovereignty of the sea was transferred from Sparta to Athens, through the haughty behaviour of Pausanias the Lacedæmonian. He had commanded at Platea, and still enjoyed the supreme authority in the war which was all this time carrying on against the Persians; but being elated with his success at Platea, and having entered into a treasonable correspondence with the enemy, he treated the captains under his command with the greatest haughtiness, giving the preference to the Spartans in such a manner that the rest of the Greeks could no longer bear his insolence. On the contrary, Aristides, and Cimon the son of Miltiades, who commanded the Athenians, by their obliging behaviour gained the favour of every body; so that the allies, having publicly affronted Pausanias, put themselves under the protection of the Athenian republic; and thenceforward the Athenians, and not the Lacedæmonians, had the supreme command.

93
Aristides
taxes Greece
with extra-
ordinary ap-
plause.

The Greeks being now sensible that they would always have occasion to be on their guard against the Persians, and that it was necessary to establish a fund by a common taxation of all the states, Aristides was pitched upon as the only person that could be trusted with the power of allotting to each of the states its proper quota. This difficult task he undertook, and executed in a manner unparalleled in the annals of history. All parties were pleased, and his taxation was

styled the happy lot of Greece. The gross amount of it was 450 talents.

Attica.

94
Themistocles banished.

It now came to the turn of Themistocles to experience the gratitude of his countrymen. His services had been so essential, that the treatment he received may perhaps be a sufficient excuse for modern patriots when they connect their own interest with the service of their country. Themistocles had plainly saved the state from ruin by his advice; he had distinguished himself by his valour; he had rendered Athens, by his policy, superior to the other states of Greece; and entirely subverted the Lacedæmonian scheme of power. Yet, notwithstanding all this, he was banished by the ostracism, without the smallest crime pretended, unless that he was hated by the Lacedæmonians, and that he had erected a temple, near his own house, dedicated to *Diana, the giver of the best counsel*; intimating that he himself had given the best counsel for the safety both of Athens and of all Greece, which was no more than the truth. Nay, he was not only driven out of Athens, but out of all Greece; so that he was forced to seek shelter from the king of Persia, against whom he had fought with so much valour. That monarch gave him a gracious reception; and he was never recalled, because the Greeks had no occasion for his services.

95
Success of
Cimon against
the Persians.

The war with Persia was not yet discontinued; the Greeks found their advantage in plundering and enriching themselves with the spoils of the king of Persia's subjects. For this reason, in the end of the 77th Olympiad, they equipped a navy, under a pretence of relieving such of the Greek cities in Asia as were subject to the Persians. Of this fleet Cimon, the son of Miltiades by the daughter of the king of Thrace, was appointed commander in chief. He had already tasted the justice and generosity of his countrymen, having been thrown into prison for his father's sine, from which he was released by *Callias*, whom his sister Elpinice married on account of his great wealth procured by no very honourable means. He accepted of the command, however; and gained such immense booty in this expedition, that the Athenians were thereby enabled to lay the foundation of those long extended walls which united the port to the city. The foundation was laid in a moorish ground; so that they were forced to sink it very deep, and at a great expence: but to this Cimon himself contributed out of his own share of the spoils, which was very considerable. He also adorned the forum with palm-trees, and beautified the academy with delightful walks and fountains.

96
He subdues
the Chersonesus.

The Persians having soon after this expedition invaded Chersonesus, and with the assistance of the Thracians made themselves masters of it, Cimon was sent against them in a great hurry. He had only four ships; but nevertheless with these he took 13 of the Persian galleys, and reduced the whole of the Chersonesus. After this he marched against the Thracians, who revolting against the Athenians, had made themselves masters of the gold mines lying between the rivers Nyssus and Strymon. The Thracians were quickly obliged to yield; after which the Athenians sent a great colony to Amphipolis a city of Thrace, which for some time made a considerable figure, but afterwards attempting to penetrate into the country of the *Edones*, great part of them were destroyed.

Cimon

Attica. Cimon also fell upon the following expedient to make Athens irrefragable at sea by the other states of Greece. Many of the Greek states, by virtue of Ariistides's taxation, were bound to furnish men and galleys, as well as to pay the tax for their support. But when they saw themselves out of danger from the Persians, most of them were very unwilling to furnish their quota of men. This the Athenian generals being offended with, were for having recourse to force; but Cimon permitted such as were desirous of staying at home to do so, and accepted a sum of money in lieu of a galley completely manned. By this means he injured the Athenians, whom he took on board his galleys, to hardship and discipline; while the allies who remained at home became enervated through idleness, and from being confederates, dwindled into tributaries, and almost slaves. In the last year of the 77th Olympiad, Cimon was sent to assist the Lacedæmonians against their Helotes, who had revolted from them. In this he was attended with his usual success: but, some time after, the Lacedæmonians being engaged in the siege of Ithome, sent again to the Athenians for succour, and Cimon was a second time sent to their relief; but the Spartans having received a sufficient supply of troops from other quarters before the arrival of the Athenian general, he and his men were dismissed without doing any thing. This grievously offended the people of Athens, who thenceforward hated not only the Lacedæmonians, but all their own citizens who were thought to be friends to that state.

98
s ha-
ted. It was not possible, however, that any person who had served the state should escape banishment at Athens. Cimon had gained great wealth both to the public and to himself. In his public character he had behaved with unimpeached honesty, and as a private citizen he dedicated his wealth to the most excellent purposes. He demolished the inclosures about his grounds and gardens, permitting every one to enter and take what fruits they pleased; he kept an open table, where both rich and poor were plentifully entertained. If he met a citizen in a tattered suit of cloaths, he made some of his attendants exchange with him; or if the quality of the person rendered that kindness unfeignable, he caused a sum of money to be privately given him. All this, however, was not sufficient: he did not concur with every measure of the commonality; and therefore the popular party determined, not to banish him, but to put him to death. The crime laid to his charge was, that by presents from the Macedonians he was prevailed upon to let slip a manifest opportunity of enlarging his conquests, after taking from the Persians the gold mines of Thrace. To this accusation Cimon replied, that to the utmost of his power he had prosecuted the war against the Thracians and other enemies of the state of Athens; but that it was true he had not made any inroads into Macedonia, because he did not imagine he was to act as a public enemy of mankind, and because he was struck with respect for a nation modest in their carriage, just in their dealings, and strictly honourable in their behaviour towards him and the Athenians: that if his countrymen looked upon this as a crime, he must abide their judgment; but, for his part, he could never be brought to think such conduct amiss. Elpinice, Cimon's sister, used all her interest in his behalf,

and amongst others spoke to Pericles the celebrated statesman and orator. He was indeed Cimon's rival, and had no doubt assisted in stirring up the prosecution against him; but he did not desire his death: and therefore, though appointed to accuse him, Pericles spoke in such a manner that it plainly appeared he did not think him guilty; and, in consequence of this lenity, Cimon was only banished by the ostracism.

The Athenian power was now risen to such an height, that all the other states of Peloponnesus looked upon this republic with a jealous eye, and were continually watching every opportunity of making war upon it when the state was engaged in troublesome affairs, and seemed to be less able to resist. These attempts, however, so far from lessening, generally contributed to increase, the power of the Athenians; but in the year before Christ 458, the republic entered into a war with Sparta, which was scarce put an end to but by the destruction of the city of Athens. For this war, there was no recent provocation on the part of the Spartans. They had sent a great army to assist the Dorians against the Phocians, and the Athenians took this opportunity to revenge themselves of former quarrels. Having therefore drawn in the Argives and Thebians to be their confederates, they posted themselves on the Isthmus, so that the Spartan army could not return without engaging them. The Athenians and their confederates amounted to 14,000, and the Spartans to 11,500. The Spartan general, however, not very willing to hazard a battle, turned aside to Tanagra, a city in Boeotia, where some of the Athenians who inclined to aristocracy entered into a correspondence with him. But before their designs were ripe for execution, the Athenian army marched with great expedition to Tanagra, so that a battle became inevitable. When the armies were drawing up in order of battle, Cimon presented himself before his countrymen in complete armour, and went to take post among those of his own tribe; but the popular party raised such a clamour against him, that he was forced to retire. Before he departed, however, he exhorted Euthippus and the rest of his friends to behave in such a manner that they might wipe off the aspersions thrown upon him, as if he had designed to betray his country's cause to the Lacedæmonians. Euthippus desired him to leave his armour, which he did; and a battle ensuing, the Athenians were defeated with great loss, and Euthippus with the rest of Cimon's friends were all killed in defence of his armour which they had surrounded. Another engagement soon followed, wherein both armies suffered so much, that they were glad to conclude a short truce, that each might have time to recruit their shattered forces.

100
They gain great advantages over the Spartans. The scale of fortune now seemed to turn in favour of the Athenians. The Thebans, who had been deprived of the command of Boeotia, on account of their having sided with Xerxes, were now restored to it by the Lacedæmonians. At this the Athenians were so displeased, that they sent an army under Myronides the son of Callias into Boeotia to overturn all that had been done. That general was met by the Thebans and their allies, who composed a numerous and well disciplined army. Nevertheless, though the Athenian army was but an handful in comparison of their enemies, Myronides gained a complete victory over the allies, in some sense

Attica.

99
War between Athens and Sparta.

100
Athenians defeated.

Attica.

sense more glorious than either that of Marathon or Plataea. In these battles they had fought against effeminate and ill disciplined Persians, but now they encountered and defeated a superior army composed of the bravest Greeks. After this victory, Myronides marched to Tanagra; which he took by storm, and razed to the ground: he then plundered Boeotia; defeated another army which the Boeotians had drawn together to oppose him; then fell upon the Locrians; and, having penetrated into Thessaly, chastised the inhabitants of that country for having revolted from the Athenians, and from thence returned to Athens laden with riches and glory.

102
Cimon re-
called.

The next year Tolmides the Athenian admiral invaded Laconia, where he made himself master of several places; and on the back of this, Pericles invaded Peloponnesus with great success, burning, spoiling, or taking, whatever places he attempted. On his return he found the people greatly out of humour on account of Cimon's banishment; so he was immediately recalled.

Cimon was no sooner returned, than he fell to his old employment of plundering the Persians; and, according to Plutarch, he had now nothing less in view than the conquest of the whole Persian empire. The Persian monarch finding he could have no rest, at last sent orders to Artabazus and Megabizus, his commanders, to conclude a treaty; which was done on the following conditions. 1. That the Greek cities in Asia should be free, and governed by their own laws. 2. That the Persians should send no army within three days journey of the sea. 3. That no Persian ship of war should sail between Thessaly and Cyrene, the former a city of Pamphylia, and the latter of Lycia.

103
His death.

While this treaty was carrying on Cimon died, whether of sickness, or of a wound he had received, is not known; and after his death the Athenian affairs began to fall into confusion. It was now the misfortune of this state to be alike hated by her enemies and allies; the consequence of which was, that the latter were perpetually revolting whenever they thought they had an opportunity of doing so with impunity. The Megarians, at this time, who had been long under the protection or dominion of Athens, thought proper for some reason or other to disclaim all dependance on their former protectors, and have recourse to Sparta, with which state they entered into a strict alliance. This the Athenians revenged by ravaging the country of the Megarians; which soon brought on a renewal of the Lacedæmonian war that had been for a little time suspended. Pericles, however, procured the return of the first Lacedæmonian army, without bloodshed, by bribing Chandrides the young king of Sparta's tutor. In the winter, Tolmides resolved to undertake an expedition into Boeotia with a small body of troops; which design he put in execution contrary to the advice of Pericles, and his rashness was soon punished by his own death and the total defeat of his army. Notwithstanding this misfortune, however, Pericles soon after invaded and reduced Eubœa; and the Lacedæmonians, finding it was not for their interest to carry on the war, concluded a truce with the Athenians for 30 years.

104
A thirty
years truce
with the
Lacedæmo-
nians.

105
Cruelty of
Pericles.

About this time Psammiticus, king of Egypt, sent by way of present to the people of Athens, 40,000 bushels of wheat; which proved a great misfortune to the city: for Pericles, out of spite to Cimon, who had

children by an Arcadian woman, had preferred a law whereby the Athenians of the half blood were disfranchised; and this law, on account of the distribution of the corn abovementioned, was prosecuted with such severity, that no less than 5000 persons, who till then had been considered as free-men, were sold for slaves. This piece of cruelty has been of great service to the critics, as by means of it we know exactly the number of Athenian citizens, which at this time amounted to no more than 14,040 persons, though Athens was now aiming at no less than erecting an universal monarchy.

Attica.

106
Number
the Ath-
nian citi-
zens.

Six years after the conclusion of the peace between Athens and Sparta, a war broke out between the Samians and Milefians about the city of Priene, seated under mount Mycale in Ionia. How this war came to affect the Athenians, is not certainly known: but, somehow or other, this republic was induced to take the part of the Milefians; and the island of Samos was reduced by Pericles, who established there a democracy, and left an Athenian garrison. He was no sooner gone, however, than the Samians, disliking their new form of government, drove out the garrison he had left; but Pericles quickly returning, besieged and took their city, demolished their walls, and fined them of the whole expence of the war, part of which he obliged them to pay down, and took hostages for the remainder. When Pericles returned, he procured himself to be appointed to pronounce the public oration in honour of those who fell; which he did with such eloquence, that when he came down from the pulpit, the women gathered about him, took him by the hand, and crowned him with garlands.

107
Samos re-
duced by
Pericles.

A little after this commenced the war between the Corcyrians and Corinthians, which by degrees brought the Athenians into those engagements that proved the ruin of their state. The causes of this war were the following. An intestine war breaking out in the little territory of Epidamnus, a city of Macedonia, founded by the Corcyrians, one party called in to their assistance the Illyrians, and the other the Corcyrians. The latter neglecting the matter, Corinth was applied to, as the Corcyrians were a colony from that place. The Corinthians, partly out of pity to the Epidamnians, and partly out of spleen to the Corcyrians, sent a very great fleet to the assistance of the former, by which means that party which had applied to Corinth was thoroughly established. This being resented by the Corcyrians, they sent a fleet to Epidamnus to support the exiles; and accordingly this fleet began to act offensively on its entering the port, the chief commanders having instructions to propose terms of accommodation, to which the Corinthians would by no means agree. The next year the Corcyrians defeated at sea the Corinthians and their allies, and took Epidamnus by storm; after which they wasted the territories of the allies of the Corinthians, which greatly exasperated the latter. At Corinth, therefore, they began to make great preparations for carrying on the war, and pressed their confederates to do the same, that they might be in a condition to retrieve the honour they had lost, and humble this ungrateful colony which had thus insulted her mother-city.

108
War be-
tween the
Corcyrian
and Corin-
thians.

The Corcyrians were no sooner acquainted with these proceedings, than they dispatched ambassadors to Athens with their complaints; and these were quickly followed

Attica. followed by others from Corinth on the same errand. At first the people of Athens inclined to favour the Corinthians; but they soon changed their minds, and took part with the Corcyrians: they contented themselves, however, with entering into a defensive alliance with that little state, whereby they promised to assist each other, in case either party should be attacked; and in consequence of this treaty they furnished the Corcyrians with ten galleys, under Lacedæmonius the son of Cimon, with whom were joined Diotenes and Proteus as colleagues.

As soon as the season of the year permitted, the Corinthians sailed for the coast of Corcyra with a fleet of 150 ships, under the command of Xenoclides, assisted by four other Corinthian admirals; each squadron of their allies being commanded by a chief of their own. The Corcyrian and Athenian fleet amounted to 120, but the Athenians had orders to give as little assistance as possible. The action was very brisk for some time: the Corcyrian right wing broke the left of the Corinthian fleet; and forcing some of the ships on shore, landed, pillaged their camp, and made a great number of them prisoners: on the other hand, the Corinthian ships in their right wing beat the Corcyrian ships there, they being but very faintly assisted by the Athenians, till the latter were at last obliged to defend themselves, which they did so well, that the Corinthians were glad to retire. The next day preparations were made on both sides for another engagement; but 20 ships coming from Athens to the assistance of the Corcyrians, the Corinthians declined the combat.

As soon as the Corcyrian war broke out, the Athenians sent orders to the citizens of Potidæa to demolish a part of their wall, to send back the magistrates they had received from Corinth, and to give hostages for their own behaviour. Potidæa was a town in Macedonia, founded by the Corinthians, but at that time in alliance with the Athenians. Perdiccas king of Macedon, who hated the Athenians, took this opportunity to persuade the Potidæans to revolt. Accordingly they sent ambassadors to Athens to intreat the revocation of these orders; but at the same time sent deputies to Sparta, to join with the Corinthians and Megarians in their complaints against the Athenians. The Athenians upon this sent a considerable fleet against Potidæa under the command of Calias, a nobleman of great courage. The Corinthians on their part dispatched one Aristeus with a considerable body of troops to the assistance of that city. An engagement following, the Athenians were victors, but with the loss of their general. Phormio, who succeeded in the command, invested the city in form, and shut up its port with his fleet; but the Potidæans dreading to fall into the hands of the Athenians, made a most obstinate defence, while in the mean time they warmly solicited the Corinthians to perform their promises, and engage the rest of the states of Peloponnesus in their quarrel.

The Lacedæmonians having heard what the Corinthians and other little states of Greece had to say against the Athenians, sent ambassadors to the latter, demanding reparation for the injuries, with orders, in case of a refusal, to declare war. The terms demanded were, in the first place, the expulsion of those Athenians who were allied to the family of Megacles so of-

ten mentioned. This article was on account of Pericles; for he was the son of Xanthippus the Athenian commander at Mycale, by Agariste niece to the famous Clisthenes, who corrupted the priests of Apollo in order to procure the expulsion of the Pisistratides. They next insisted that the siege of Potidæa should be raised; thirdly, that the inhabitants of Ægina should be left free; and lastly, that a decree made against the Megarians, whereby they were forbid the ports and markets of Athens, should be revoked, and all the Grecian states under the dominion of Athens set at liberty.

These terms the Athenians were persuaded by Pericles to reject. The arguments used by him were in substance as follows: That whatever the Lacedæmonians might pretend as to the justice of the complaints of the allies, the true ground of this resentment was the prosperity of the Athenian republic, which the Spartans always hated, and now sought an opportunity of humbling; that it must be owing to the Athenians themselves if this design succeeded, because for many reasons Athens was better able to engage in a long and expensive war than the Peloponnesians. He then laid before the people an exact account of their circumstances; putting them in mind, that the treasure brought from Delos amounted to 10,000 talents; and that tho' 4000 of these had been expended on the stately gate of their citadel, yet that 6000 were still in hand; that they were also intitled to the subsidies paid by the confederate states; that the statues of their gods, the Persian spoils, &c. were worth immense sums; that private men were arrived at vast fortunes; and that, considering their trade by sea, they had a certain annual increase of wealth; that they had on foot an army of 12,000 men, and in their colonies and garrisons 17,000; that their fleet consisted of 300 sail; whereas the Peloponnesians had no such advantages. For these reasons he proposed as the most feasible, and likewise the most equitable satisfaction that could be given, that they would reverse their decree against Megara, if the Lacedæmonians would allow free egress and regress in their city to the Athenians and their allies; that they would leave all those states free who were free at the making of the last peace with Sparta, provided the Spartans would also leave all states free who were under their dominion; and that future disputes should be submitted to arbitration. In case these offers should be rejected, he advised them to hazard a war; telling them, that they should not think they ran that hazard for a trifle, or retain a scruple in their minds as if a small matter moved them to it, because on this small matter depended their safety, and the reputation of their constancy and resolution; whereas, if they yielded in this, the next demand of the Lacedæmonians would be of a higher nature; for having once discovered that the Athenians were subject to fear, they would thence conclude that nothing could be denied to Sparta, whereas a stiff denial in this case would teach them to treat Athens for the future on terms of equality. He enforced these reasons by shewing that their ancestors had always acted on the like principles, and in all cases preferred their glory to their ease, and their liberty to their possessions.

This was the origin of the Peloponnesian war, which makes so great a figure in ancient history. The

Attica.

173
Their terms
rejected by
advise of
Pericles.

Attica.

immediate preliminary to general hostilities was an attempt of the Thebans to surprize Platæa. With this view they sent Eurymachus with 300 Thebans to assist such of the Platæans as they had drawn over to their interest, in making themselves masters of the place.

113
Attempt of
the Thebans
on Platæa.

In this design they succeeded very well at first, the Platæans who had promised to open the gates keeping their words exactly, so that they were instantly in possession of the city. The other party, however, perceiving how small a number they had to contend with, unanimously rose upon them, killing a great many, and forcing the rest to surrender themselves prisoners of war. Another party came from Thebes to assist their countrymen; but they arrived too late: the Platæans, however, foreseeing that they would waste their country, promised to release the prisoners if they would forbear to spoil their lands. On this the Thebans withdrew; and the Platæans cruelly put to death all their prisoners, to the number of 180, with Eurymachus their chief, alleging that they had not promised their release but in case of peace. The Athenians, as soon as they had notice of this attempt of the Thebans, caused all the Boeotians in their territory to be arrested; and when they understood how the Platæans had delivered themselves, they sent a great convoy of provisions to that city, and a numerous body of troops to escort their wives and children to Athens.

114
They are
massacred.

Both parties now prepared in earnest for war, both sent ambassadors to the Persians, and both sought to rouse their allies. Most of the Greek states inclined to favour the Spartans, because they acted on this occasion as the deliverers of Greece, and because they either had been, or feared that they would be, oppressed by the Athenians. With the Spartans joined all the Peloponnesians, except the Argives and part of the Achæans; without Peloponnesus, the Megarians, Phocians, Locrians, Boeotians, Ambraciots, Leucadians, and Anactorians, declared themselves on their side. On the other hand, the Chians, Lesbians, Platæans, Messenians, Acarnanians, Corcyrians, Zacynthians, Carians, Dorians, Thracians, most part of the islands, and all the Cyclades excepting Melos and Thera, with Eubœa and Samos, joined the Athenians.

115
Account of
the allies on
both sides.

The Peloponnesian war commenced 431 years before Christ. The Lacedæmonian army was assembled at the Isthmus, and consisted of no less than 60,000 men; but before Archidamus king of Sparta, who commanded in chief, would enter Attica, he dispatched a herald to Athens. The herald was sent back without any answer, by which all hopes of peace were cut off. As Archidamus was a friend to Pericles, the latter apprehended that he might forbear plundering his estates. With this he immediately acquainted the people; telling them at the same time, that in such a case he made a present of his lands to the public. He then advised the citizens to take no care of defending their country-seats, but to attend only to the city, busy themselves in the equipping of ships, and settle a thorough resolution not to be intimidated with the first evils of war. This proposal the Athenians readily complied with, and appointed Pericles commander in chief, with nine more generals to assist him.

The first year, the Spartan army committed great ravages in Attica, Pericles having no force capable of opposing it, and refusing to engage on disadvantageous

terms, notwithstanding prodigious clamours were raised against him by his countrymen. The allies, however, had no great reason to boast of the advantages they gained this year: an Athenian fleet ravaged the coasts of Peloponnesus; another infected the Locrians, drove out the inhabitants of Ægina, and re-peopled the island from Athens. They likewise reduced Cephalenia, and some towns in Acarnania and Leucas which had declared for the Lacedæmonians; and in the autumn, when the Peloponnesians were retired, Pericles entering the Megarian territory, did all the mischief that could be expected from a provoked enemy.

The spring of the second year was very fatal to Athens by a dreadful plague which destroyed great numbers of the citizens, while the Peloponnesians under Archidamus wasted every thing abroad. In the midst of these distresses, however, Pericles retained his courage, and would suffer none of his countrymen to stir without the city either to escape the plague or infect the enemy. He caused a great fleet to be equipped, on board which he embarked 4000 foot and 300 horse, with which he sailed to Epidaurus. Upon this, the enemy withdrew their forces out of Attica; but Pericles was able to do no great matter on account of the plague, which made so great havoc among his men, that he brought back to Athens only 1500 of the 4000 he carried out. By this misfortune the Athenians were thrown into despair; they immediately sued for peace, which the Spartans were now too proud to grant; then turning their rage upon Pericles, they dismissed and fined him. Soon after, Pericles's children and almost all his relations died of the plague; so that this great statesman was overwhelmed with melancholy, and for some time shut himself up from public view: at last, through the persuasion of Alcibiades and some others, he shewed himself to the people. They received him with acclamations, and at his request repealed the unjust law he had made, whereby all Athenians of the half-blood were disfranchised, and then reinstated him in all his former honours. Hereupon he inrolled the only son he had left, who before had been counted a bastard on account of his mother being a Milesian.

Attica.

117
Second year.
A dreadful
plague at
Athens.

118
Athenians
sue for
peace.

119
Pericles re-
peals the
repeal of his
law.

This year also the island of Zacynthus was wasted by the Peloponnesians; and the city of Potidæa submitted to the Athenians, after the inhabitants had been driven to such extremity as to feed upon human flesh. The Athenians permitted the men to depart with one garment, and the women with two; after which, the town was re-peopled by a colony from Athens.

The third year of the Peloponnesian war was remarkable for the death of the great Pericles, who was taken off by the plague. Platæa also was besieged by Archidamus; but without success, even though the greatest part of it was set on fire; the Platæans resolving to submit to every kind of misery rather than abandon the Athenian cause. In the end, therefore, the king of Sparta was obliged to turn the siege into a blockade; and having thrown up an entrenchment fortified with a deep ditch, he left a sufficient number of men to guard his lines, and then returned back to Peloponnesus.

The following summer, the Peloponnesians under the command of Archidamus invaded Attica, where they wasted every thing with fire and sword; at the same time the whole island of Lesbos, except the district of Methymna,

121
Fourth year.
Desperate
attempt of
the Platæ-
ans.

Attica.

Methymna, revolted from the Athenians, who hereupon invested the city of Mitylene. All this time the city of Platæa was blocked up by the Peloponnesians; and its inhabitants being now greatly distressed for want of provisions, the garrison, consisting of 400 natives and 80 Athenians, came to the desperate resolution of forcing a passage through the enemies lines. When they came to attempt this, however, many of them were intimidated: but 300 persisted in their resolution; and of these, 212 got safe through and marched to Athens, but the rest were compelled to retire.

123
5th year.
Mitylene,
&c. taken
by the A-
thenians.

In the beginning of the fifth year, the Peloponnesians sent 40 ships to the relief of Mitylene; but without effect, for the place had surrendered before the fleet could come to its assistance. Paches, the Athenian commander, likewise chased away the Peloponnesian fleet upon its arrival; and returning to Lesbos sent the Lacedæmonian minister whom he found in Mitylene, together with a deputation, to Athens. On their arrival, the Lacedæmonian was immediately put to death; and in a general assembly of the people, it was resolved, that all the Mitylenians who were arrived at man's estate should be put to death, and the women and children sold for slaves. The next day, however, this cruel decree was reversed, and a galley sent with all expedition to countermand these bloody orders. This last vessel, however, could not get before the other: but Paches, being a man of great humanity, had taken a day to consider on the orders he had received; during which time, the last mentioned galley arrived; in consequence of which, only about 1000 of the most forward rebels were put to death, the walls of the city were also demolished, their ships taken away, and their lands divided among the Athenians, who let them again to their old masters at very high rents. The same summer the Athenians seized the island of Minoas, lying over against the territory of Megara; and likewise the port Nisæa, which last they fortified, and it proved afterwards a place of the utmost importance to them. At this time also the Platæans, driven to the last extremity, surrendered to the Lacedæmonians, by whom they were, to the number of 208, including 25 Athenians, put to death, and their women sold for slaves. Their city was soon after raised by their implacable enemies the Thebans, who left only an inn to show where it stood. The same of Platæa, however, induced Alexander the Great afterwards to rebuild it.

124
6th year.
Attica and ra-

In this year happened the famous sedition of Corcyra, whence other seditions, when their effects rendered them terrible, have been called *Corcyrian*. It hath been already observed, that the war between the Corcyrians and Corinthians brought on the general war throughout Peloponnesus. A great number of Corcyrians were in the beginning of this war carried away prisoners into Peloponnesus, where the chief of them were very well treated, but the rest sold for slaves. The reason of this conduct of the Corinthians was a design they had formed of engaging these Corcyrians to influence their countrymen to side with them and their allies. With this view they treated them with all imaginable lenity and tenderness, inuring into them by degrees an hatred of democratic government; after which they were told, that they might obtain their liberty upon condition of using all their influence at home in favour of the allies, and to the prejudice of Athens.

This the Corcyrians readily promised, and endeavoured to perform. At first, those who were for an aristocracy prevailed, and murdered all those of the opposite party that fell into their hands, in which they were assisted by a fleet of Peloponnesians: but the Athenians sending first one fleet and then another to the assistance of the distressed party, the Peloponnesians were forced to withdraw; after which, the democratic party sufficiently revenged themselves, and destroyed their antagonists without mercy. The worst of all was, that, this example once set, the several states of Greece felt in their turns the like commotions, which were always heightened by agents from Sparta and Athens; the former endeavouring to settle aristocracy, and the latter democracy, wherever they came.

While the Athenians were thus engaged in a war wherein they were already overmatched, they foolishly engaged in a new one, which in the end proved more fatal than all the rest. The inhabitants of Sicily were split into two factions; the one called the *Doric*, at the head of which was the city of Syracuse; the other the *Ionie*, which owned the Leontines for their chiefs: the latter perceiving themselves too weak without foreign aid, sent one Georgias, a celebrated orator, to apply to Athens for relief; and he by his fine speeches so captivated the giddy and inconstant Athenians, that they ran headlong into a war which they were unable to maintain while engaged with all the Peloponnesians. Enticed by this new prospect, therefore, and grasping at the conquest of Sicily, as well as of all Greece, they sent a fleet to the assistance of the Leontines, under the command of Laches and Chabrias; and they were no sooner sailed, than another fleet for the same purpose was begun to be fitted out. All this time, the plague continued to rage with great violence at Athens, cutting off this year 4000 citizens, besides a much greater number of the meaner sort of people.

126
Athenians
engage in a
war with
Sicily.

The sixth year of the Peloponnesian war was remarkable for no great exploit: Agis the son of Archidamus, king of Sparta, assembled an army in order to invade Attica, but was prevented from so doing by many great earthquakes which happened throughout Greece. The next year, however, he entered Attica with his army, while the Athenians on their part sent a fleet under the command of Demosthenes, to invest the coasts of Peloponnesus. As this fleet passed by Laconia, the commander took notice that the promontory of Pylus, which was joined to the continent by a narrow neck of land, had before it a barren island about two miles in circumference, in which, however, there was a good and safe port, all winds being kept off by the headland, or by the isle. These advantages made him apprehend, that a garrison left here would give the Peloponnesians so much trouble, that they would find it more advisable to protect their own country than to invade that of their neighbours. Accordingly, having raised a strong fortification, he himself with five ships staid to defend it, while the rest of the fleet proceeded on their intended expedition. On the news of this event, the Peloponnesian army immediately returned to besiege Pylus. When they arrived before the place, they took possession of the harbour, and then caused a chosen body of Spartans take possession of the island of Sphacteria, after which they attacked the fort with great vigour.

127
Sixth year.

128
Seventh
year.
Pylus forti-
fied by the
Athenians.

129
Besieged.

Attica.

130
Spartan
fleet de-
stroyed.

gour. Demosthenes and his garrison defended themselves with great valour; and an Athenian fleet arriving very seasonably, offered battle to the Peloponnesian fleet. This being refused, the Athenians boldly sailed into the harbour, broke and sunk most of the vessels therein, after which they besieged the Spartans in Sphacteria. The Peloponnesians now began to treat with their enemies, and a truce was concluded during the time that negotiations were carried on at Athens. One of the articles of this truce was, that the Peloponnesians should deliver up all their ships, on condition of having them punctually returned in case the treaty did not take effect. The Athenians having heard the Spartan ambassadors, were inclined to put an end to this destructive war: but Cleon, one of their orators, a warm and obstinate man, persuaded his countrymen to insist on very unreasonable terms; upon which the ambassadors returned, and by so doing put an end to the truce. The Peloponnesians then demanded their vessels; but the Athenians refused to deliver them, under pretence of their having broke the truce.

131
Treachery
of the A-
thenians.

132
They at-
tack Spac-
teria.

133
Cleon the
orator ap-
pointed ge-
neral.

Hostilities being thus recommenced on both sides, the Lacedæmonians attacked the Athenians at Pylus, while the latter attacked the Spartans at Sphacteria. The Spartans, though but an handful of men and under every imaginable discouragement, behaved with such bravery, that the siege proceeded very slowly, so that the people of Athens became very uneasy. They began then to wish they had embraced the offers of the Spartans, and to rail vehemently against Cleon, who, to excuse himself, said, it would be easy for the general of the forces they were at that time sending, to attack the Spartans in the isle, and reduce them at once. Nicias, who had been appointed to this command, replied, that if Cleon believed he could do such great things, he would do well to go thither in person: the latter, imagining this only meant to try him, said he was ready to go with all his heart; whereby Nicias caught him, and declared that he had relinquished his charge. Cleon thereupon said, that he was no general: but Nicias told him that he might become one; and the people, pleased with the controversy, held the orator to his word. Cleon then advancing, told them he was so little afraid of the enemy, that, with a very inconsiderable force, he would undertake, in conjunction with those already at Pylus, to bring to Athens the Spartans who gave them so much trouble in 20 days. The people laughed at these promises: however, they furnished him with the troops he desired; and to their surprise, Cleon brought the Spartans prisoners to Athens within the time appointed.

134
He takes the
place.

135
End of the
Coreyrian
sedition.

This summer, likewise, an Athenian fleet was sent to Sicily, with instructions to put in at Coreyra, and assist the government against the Lacedæmonian faction which still subsisted in that island. This they effectually performed; for by their means the exiles fell into the hands of the other party: these they imprisoned; and then drew them out by 20 at a time, to suffer death, which was inflicted with all the circumstances of cruelty that party-rage could suggest. When only 60 remained, they intreated the Athenians to put them to death, and not to deliver them up to their countrymen: but upon this the Coreyrians surrounded the place where they were confined, endeavouring to bury them under their darts; upon which the unhappy cap-

tives all put an end to their own lives.

In the eighth year Nicias reduced the isle of Cythera on the coast of Laconia; as likewise Thyrea, on the confines of that country. The latter had been given to the Æginetans when expelled from their own country by the Athenians; and they were now condemned to death, as inveterate enemies of the Athenian state and nation.—In Sicily, one Hermocrates of Syracuse persuaded all the inhabitants of the island to adjust their differences among themselves; upon which the Athenian generals returned home, and for so doing two of them were banished, and the third sentenced to pay a heavy fine.

The Athenians next laid siege to Megara under the conduct of Hippocrates and Demosthenes; but Brasidas a Spartan general coming to its relief, a battle ensued, by which, though neither party got the better, the Lacedæmonian faction prevailed in Megara, and many who favoured the Athenians were forced to withdraw. After this, such as had been banished for adhering to the Lacedæmonians were allowed to return, on their taking an oath to forget what was past, and attempt nothing that might disturb their country. As soon as they were settled, however, they forgot their oath; and causing 100 of those who were most obnoxious to be apprehended, forced the people to condemn them to death. They then changed the whole form of government, introduced an oligarchy, and possessed themselves of the supreme power.

137
Spartan
party pre-
vails in Me-
gara.

In Boeotia some commotions were raised in favour of the Athenians; but their generals Hippocrates and Demosthenes being defeated by the opposite party, all hopes ceased of the Athenian power being established in Boeotia. In the mean time Brasidas reduced the city of Amphipolis, which greatly alarmed the Athenians, who thereupon sent new supplies of men, money, and ships, to the Macedonian coast; but all their care could not prevent a great desertion from their interest in those parts, where the valour and conduct of Brasidas carried all before him.

138
Athenians
lose their
power in
Boeotia.

In the ninth year, the Spartans made new proposals of peace, which the Athenians were now more inclined to accept than formerly; and finding their affairs very much unsettled by the loss of Amphipolis, a truce for a year was quickly agreed on, while negotiations were in the mean time carrying on for a general peace. This pacific scheme, however, was very soon overthrown by the following accident in Thrace. The city of Scione, and that of Menda, revolted to Brasidas; who, knowing nothing of the truce, sought to draw over Potidæa also. The Athenians, pretending that Scione revolted two days after the truce was concluded, made heavy complaints; asserting that this was a breach of the truce, and that both it and Menda should be restored to them. This not being effected by negotiations, an army was sent against the two cities, by which Menda was reduced; but Scione making an obstinate defence, the siege was turned into a blockade.

139
Ninth year.
A truce con-
cluded and
broken.

In the tenth year, Brasidas made an attempt upon Potidæa; which having failed, the Athenians began to recover some courage. The truce expiring on the day of the Pythian games, Cleon persuaded the Athenians to send an army into Thrace under his own command. It consisted of 1200 foot and 300 horse, all Athenian citizens, who embarked on board 30 galleys. Bra-
sidæ

140
Tenth year.
Cleon de-
feated and
killed by
Brasidas.

Attica.

136
Eighth year.
Success of the A-
thenians.

fidæ had an army much inferior; but observing that the Athenian general was become careless, and neglected discipline, he attacked him. In this engagement Cleon was killed, and the Athenians defeated with the loss of 600 men, while the Spartans lost only seven; but among these was their brave commander Brasidas, whose death affected them almost as much as the loss of their army did the Athenians.

As the death of Cleon deprived the Athenians of one of their best speakers, and one who had been very industrious in promoting the war, they were now much more disposed than formerly to hearken to terms of accommodation. Amongst the Spartans, too, there was a party, at the head of whom was Plisitonax their king, who earnestly wished for peace; and as Nicias laboured no less assiduously at Athens to bring about this desirable event, a peace was at last concluded for fifty years between the two nations. The conditions were, that a restitution of places and prisoners should be made on both sides; excepting that Nisæa should remain to the Athenians, who had taken it from the Megarians; and that Platæa should continue with the Thebans, because they absolutely would not give it up. The Bœotians, Corinthians, and Megarians, refused to be included in this peace: but the rest of the allies yielded to it; and it was accordingly ratified, receiving the name of the *Nician* peace, from Nicias who had so vigorously promoted it.

By this means, however, tranquillity was far from being restored. Such of the states of Peloponnesus as were dissatisfied, began immediately to league among themselves, and to set on foot a new confederacy, the head of which was to be the state of Argos. The Lacedæmonians, too, found it impossible to perform exactly the articles of agreement; the city of Amphipolis in particular, absolutely refused to return under the Athenian government; for which reason the Athenians refused to evacuate Pylus. In the winter, new negotiations were entered into on all sides, but nothing determined, and universal murmuring and discontent took place. These discontents were not a little heightened by Alcibiades, who now began to rival Nicias, and, perceiving the Lacedæmonians made their court mostly to his rival, took all opportunities to incense his countrymen against that nation. Nicias, on the other hand, who wished for nothing so much as peace, used all his endeavours to bring about a reconciliation. The artifices of Alcibiades, however, added to the turbulent and haughty disposition of both nations, rendered this impossible; so that though Nicias went on purpose to Sparta, he returned without doing any thing.

Alcibiades, having thus disposed every thing according to his wishes, and a war being inevitable, he began to take the most prudent methods for preserving his country in safety. With this view, he entered into a league for 100 years with the Argives, which he hoped would keep the war at a distance: he next passed over into the territories of Argos, at the head of a considerable army; and laboured, both at that city and at Patræ, to persuade the people to build walls to the sea, that so they might the more easily receive assistance from the Athenians. But though great preparations for war were now made, nothing was undertaken this year; only the Argives thought to have made themselves masters of Epidaurus, but were hindered by the

Lacedæmonians putting a garrison into it.

The next year (the 14th after the Peloponnesian war was first begun) a Spartan army, under the command of Agis, entered the territory of Argos where the confederate army lay; but just as the engagement was about to begin, a truce was suddenly concluded by two of the Argive generals and the king of Sparta. With this neither party was pleased, and both the king and generals were very ill treated by their citizens. On the arrival of some fresh troops from Athens, therefore, the Argives immediately broke the truce: but the allied army was soon after defeated with great slaughter by Agis; notwithstanding which, however, the Æleans and Athenians invested Epidaurus. In the winter, a strong party in Argos joined the Lacedæmonians; in consequence of which, that city renounced her alliance with Athens, and concluded one with Sparta for 50 years. In compliment to their new allies, also, the Argives abolished democracy in their city, establishing an aristocracy in its place, and assisted the Lacedæmonians with a considerable body of troops to force the Sicyonians to do the same.

In the beginning of the 15th year, the Argives, with a levity seemingly natural to all the Greeks, renounced their alliance with Sparta, abolished aristocracy, drove all the Lacedæmonians out of the city, and renewed their league with Athens. The Athenians, in the mean time, being convinced of the treachery of Perdiccas king of Macedon, renounced their alliance with him, and declared war against him.

Next year, Alcibiades terminated the disputes in the city of Argos, by the banishment of the Spartan faction; after which he sailed to the island of Melos, whose inhabitants had acted with the greatest inveteracy against his countrymen: perceiving, however, that the reduction of the island would be a work of time, he left a considerable body of forces there, and returned to Athens. In his absence the capital of Melos surrendered at discretion, and the inhabitants were treated with the utmost cruelty; all the men capable of bearing arms being slaughtered, and the women and children carried into captivity.

In the beginning of the 17th year, Nicias was appointed commander of an expedition against the Syracusans, along with Alcibiades and Lamachus as colleagues. But while the necessary preparations were making, all things were thrown into confusion by the desecrating of the Hermæ, or statues of Mercury, of which there was a great number in the city. The authors of this sacrilege could by no means be discovered, though rewards were offered for this purpose: at last the suspicion fell upon Alcibiades, and for this weighty reason he was commanded to return from Sicily to take his trial. Alcibiades, however, knew the temper of his countrymen too well to trust himself to their mercy; and therefore, instead of returning to Athens, he fled immediately to Sparta, where he met with a gracious reception; while the infuriated Athenians were severely punished by the loss of their army, generals, and fleet in Sicily, which the superior abilities of Alcibiades would in all probability have prevented.

The 19th and 20th years of the war were spent by the Athenians in equipping a new fleet in order to repair their vast losses: but Alcibiades hurt their interests very much, by persuading Tissaphernes the Persian to league

Attica.

245
Fourteenth
year. War
renewed.

146
Athenians,
&c. defeat-
ed at Man-
tinæa.

147
Fifteenth
year.

148
Sixteenth
year. Me-
los reduced
by the A-
thenians.

149
Seventeenth
year. Athe-
nian army
in Sicily
lost, and
Alcibiades
fled to Spar-
ta.

150
Nineteenth
and twen-
tieth years,
&c.

Attica.

Attica.

151
Alcibiades
flies to Per-
sia.

154
The army
declare for
a democracy
and recall
Alcibiades.

league with the Spartans against them; at the same time he persuaded several of the Ionian states to revolt from Athens, but they were in a short time obliged again to submit. Notwithstanding all these services, however, Alcibiades had rendered himself so hateful to Agis by debauching his wife, that he soon found himself obliged to fly to the Persians, where Tissaphernes gave him a very favourable reception, and profited much by his advice, which was, to let the Greeks weaken one another by their mutual wars, and that the Persians ought never to see one state totally destroyed, but always to support the weaker party.

153
Proposes the aboli-
tion of de-
mocracy at
Athens.

When Tissaphernes had acquiesced with these counsels, Alcibiades privately wrote to some of the officers in the Athenian army at Samos, that he had been treating with the Persians in behalf of his countrymen, but did not chuse to return till the democracy should be abolished; and to incline the citizens to comply with this measure, he told them that the Persian king disliked a democracy, but would immediately assist them if that was abolished, and an oligarchy erected in its stead.

On the arrival of Pisander and other deputies from the army, with the proposals of Alcibiades, the Athenians without hesitation resolved to overturn that democracy which they had all along so strenuously defended. The issue of their present debates was, that Pisander with ten deputies should return to Alcibiades, in order to know on what terms the king of Persia would make an alliance with them; but that cunning Athenian having perceived that Tissaphernes was by no means disposed to assist the Athenians on account of their having been lately successful, he set up such high demands in the king of Persia's name, that the Athenians of themselves broke off the treaty, and thus Alcibiades preserved the friendship of both parties.

153
New form
of govern-
ment esta-
blished.

Pisander having engaged the army at Samos in his scheme of overturning democracy, that form of government was abolished first in the cities subject to Athens, and lastly in the capital itself. Pisander's new scheme was, That the old form of government should be totally dissolved: that five prytanes should be elected: that these five should chuse 100; and that each of the hundred should chuse three: that the 400 thus elected should become a senate with full power; but should occasionally consult with 5000 of the most wealthy citizens, who should thenceforward be esteemed *only the people*; and that no authority should remain with the lower class. Though the people were not very fond of this change, those who conducted it, being men of great parts, found means to establish it by force; for when the people were gone out of the city to their ordinary employments, the 400, having each a dagger concealed under his vest, attended by a guard of 120 men, entered the senate-house, dissolved the old senate, and without ceremony turned them out; after which the commons, not knowing whom to submit to, or to whom to apply, made no opposition.

The first step of the new governors was to destroy all their enemies; who, however, were not very numerous, so that little blood was shed. They next sent ambassadors to Agis to sue for peace; but he, taking for granted that the Athenians would never defend an oligarchy, gave no answer to the ambassadors, but immediately marched towards the capital with a design

to attack it. On his arrival, however, he was quickly convinced of his mistake, being repulsed with loss, and obliged to retire to his old post.

In the mean time the Athenian army declared again for a democracy; and having recalled Alcibiades, invested him with full power, and insisted on his immediate return to Athens to restore the ancient government. This measure he refused to comply with, and persuaded them to stay where they were, in order to save Ionia: he also prevailed on them to allow some deputies, who had been sent from the new governors of Athens, to come and deliver their message. To these deputies Alcibiades replied, that they should immediately return to Athens, and acquaint the 400, that they were commanded immediately to resign their power and restore the senate; but that the 5000 might retain theirs, provided they used it with moderation.

By this answer, the city was thrown into the utmost confusion; but the new government party prevailing, ambassadors were dispatched to Sparta with orders to procure peace on any terms. This, however, was not to be effected; and Phrynicus, the head of the embassy, and likewise of the new government party, was murdered on his return. After his death, Theramenes, the head of the other party, seized the chiefs of the 400; upon which a tumult ensued that had almost proved fatal to the city itself. The mob, however, being at last dispersed, the 400 assembled, tho' in great fear, and sent deputies to the people, promising to set all things to rights. In consequence of this deputation, a day was appointed for convoking a general assembly, and settling the state; but when that day came, news was brought that the Lacedæmonian fleet appeared in view, and steered directly for Salamis. Thus all was again thrown into confusion; for the people, instead of deliberating on the subject proposed, ran in crowds down to the port, and perceiving the Spartans towards Eubœa, a fleet of 36 ships was immediately dispatched under the command of Thymochares, to engage the enemy. This fleet was utterly defeated, 22 of the Athenian ships being taken, and most of the others sunk or disabled; but what was worse, this defeat was followed by the revolt of all the country of Eubœa except Orcus.

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Athenian
fleet de-
stroyed by
the Spar-
tans.

When these dismal tidings arrived at Athens, every thing was given up for lost; and had the Lacedæmonians taken this opportunity of attacking the city, they had undoubtedly succeeded, and thus put an end to the war: but being at all times slow, especially in naval affairs, they gave the Athenians time to equip a new fleet, and to retrieve their affairs. One good effect of this disaster, however, was the putting an end for a time to the internal dissensions of this turbulent people; inasmuch that Thucydides the historian is of opinion, that the republic never enjoyed so much quiet as at this time.

Alcibiades now shewed his abilities and inclination to serve his country in an eminent manner. By his intrigues he so effectually embroiled the Persians and Peloponnesians with each other, that neither party knew whom to trust. Thrasylbulus, with 55 ships, gained a victory over the Peloponnesian fleet consisting of 73: after which he took 8 galleys coming from Byzantium; which city had revolted from the Athenians, but was soon after taken, and the inhabitants severely fined.

157
Exploits of
Alcibiades.

fined. The fleet being afterwards joined by Alcibiades, nine more of the Peloponnesian galleys were taken, the Halicarnassians were constrained to pay a large sum of money, and Cos was strongly fortified; which transactions ended the 21st year of the Peloponnesian war.

In the succeeding years of this famous war, the Athenians had at first great advantages. Thrasylbulus gained a signal victory at sea; and Alcibiades gained two victories, one by sea and another by land, in one day, took the whole Peloponnesian fleet, and more spoil than his men could carry away. The Spartans were now humbled in their turn, and sued for peace; but the Athenians were so intoxicated with their success, that they sent back the ambassadors without an answer, which they soon had sufficient reason to repent of. The beginning of the Athenians misfortunes was the taking of Pylos by the Spartans. The Athenians had sent a fleet under the command of one Anytus to its defence: but he was driven back by contrary winds; upon which he was condemned to death, because he could not cause the wind blow from what quarter he pleased: this sentence, however, was remitted on his paying a vast sum of money. This misfortune was quickly followed by another. The Megarians surprised Nisæa; which enraged the Athenians so much, that they immediately sent an army into that country, who defeated the Megarians who opposed them, with great slaughter, and committed horrid devastations.

These misfortunes as yet, however, were overbalanced by the great actions of Alcibiades, Thrasylbulus, and Theramenes. When Alcibiades returned, he brought with him a fleet of 200 ships, and such a load of spoils as had never been seen in Athens since the conclusion of the Persian war. The people left their city destitute, that they might crowd to the port, to behold Alcibiades as he landed; old and young blessed him as he passed; and next day when he made a harangue to the assembly, they directed the record of his banishment to be thrown into the sea, absolved him from the curses he lay under, and created him general with full power. Nor did he seem inclined to indulge himself in ease, but soon put to sea again with a fleet of 100 ships. He had not been long gone, however, before all this was forgot. Alcibiades sailed to the Hellespont with part of his fleet, leaving the rest under the command of Antiochus his pilot, but with strict orders to attempt nothing before his return. This command the pilot paid no regard to, but provoked Lyfander the Lacedæmonian admiral to an engagement, and in consequence of his temerity was defeated with the loss of 15 ships, himself being killed in the engagement. On the news of this defeat Alcibiades returned, and endeavoured to provoke the Lacedæmonians to a second battle: but this Lyfander prudently declined; and in the mean time the Athenians, with unparalleled ingratitude and inconstancy, deprived Alcibiades of his command, naming ten new generals in his room.

This was the last step the Athenians had to take for perfecting their ruin. Conon, who succeeded to the command, was defeated by Callicratidas Lyfander's successor; but being afterwards strongly reinforced, the Lacedæmonians were entirely defeated with the loss of

77 ships. Such a victory might at this time have inspired the Athenians with some kind of gratitude towards the generals who gained it: but instead of this, on pretence of their not having assisted the wounded during the engagement, eight of them were recalled; two were wife enough not to return; and the six who trusted to the justice of their country, were all put to death.

The next year Lyfander was appointed commander of what fleet the Peloponnesians had left, with which he took Thafus and Lampacus. Conon was dispatched against him with 180 ships, which being greatly superior to Lyfander's fleet, that general refused to come to an engagement, and was blocked up in the river Ægos. While the Athenians lay there, they grew quite idle and careless; insomuch that Alcibiades, who had built a castle for himself in the neighbourhood, intreated them to be more on their guard, as he well knew Lyfander's abilities. They answered, that they wondered at his assurance, who was an exile and a vagabond, to come and give laws to them; telling him, that if he gave them any farther trouble, they would seize and send him to Athens. At the same time they looked on victory as so certain, that they consulted what they should do with their prisoners; which, by the advice of Philoctes their general, was, to cut off all their right hands, or, according to Plutarch, their right thumbs; and Adiamantus one of their officers rendered himself very obnoxious by saying, that such idle discourse did not become Athenians. The consequences of such conduct may be easily imagined. Lyfander fell unexpectedly upon them, and gained a most complete victory; Conon, with eight galleys only, escaping to Cyprus; after which Lyfander returned to Lampacus, where he put to death Philoctes with 3000 of his soldiers, and all the officers except Adiamantus. This execution being over, he reduced all the cities subject to Athens; and with great civility sent home their garrisons, that so the city might be overstocked with inhabitants, and destitute of provisions, when he came to besiege it; which he did soon after by sea, while Agis with a great army invellied it by land.

For a long time the Athenians did not so much as desire a peace; but at last were forced to send deputies to Agis, who sent them to Sparta, where no terms could be granted except they consented to demolish their walls. They next sent to Lyfander, who after a long attendance referred them to Sparta; and thither Theramenes with some other deputies was immediately sent. On their arrival, they found the council of the confederates sitting, who all except the Spartans gave their votes that Athens should be utterly destroyed; but they would not consent to the ruin of that city, which had deserved so well of Greece. On the return of Theramenes, peace was concluded, on condition, that the long walls and the fortifications of the port should be demolished; that they should give up all their ships but 12, receive all they had banished, and follow the fortune of the Lacedæmonians. These few terms were punctually executed. Lyfander caused the walls to be pulled down; all the music in his army playing, on that very day of the year on which they had beat the Persians at Salamine. He likewise established an oligarchy expressly against the will of the people; and thus the ruin of Athens ended the 27th year

Attica.

163
They are
utterly de-
feated by
Lyfander.

164
Who takes
Athens.

165
Terms of
peace.

year

Attica.

year of the Peloponnesian war, and the 404th before Christ.

166
The thirty tyrants.

As soon as Lyfander had demolished the long walls, and the fortifications of the Piræum, he constituted a council of thirty, with power, as was pretended, to make laws, but in truth to subjugate the state. These are the persons so famous in history, under the title of *the thirty tyrants*. They were all the creatures of Lyfander: who, as they derived their rise from conquest and the law of the sword, exercised their offices in a suitable manner; that is, with the highest testimonies of pride, insolence, and cruelty. Instead of making laws, they governed without them; appointed a senate, and magistrates, at their will; and, that they might do all things without danger of controul, they sent for a garrison from Lacedæmon; which was accordingly granted them, under the command of Callidius, upon their promise to pay the soldiers regularly. One of the first steps they took was to punish all informers; which, though severe, was popular: but when, through flattery and bribes, they had wholly drawn over Callidius to their party, they suffered bad men to live in quiet, and turned their rage against the good.

167
Critias and Theramenes, their opposite characters.

Critias and Theramenes were at the head of the thirty, men of the greatest power and abilities in Athens. The former was ambitious and cruel without measure, the latter was somewhat more merciful: the former pushed on all the bloody schemes framed by his confederates, and carried into execution many of his own; the latter always opposed them, at first with moderation, at last with vehemence. He said, that power was given them to rule, and not to spoil, the commonwealth; that it became them to act like shepherds, not like wolves; and that they ought to beware of rendering themselves at once odious and ridiculous, by attempting to domineer over all, being such a handful of men as they were. The rest, disliking much the former part of his discourse, caught hold of the latter, and immediately chose out 3000, whom they made the representatives of the people, and to whom they granted this notable privilege, that none of them should be put to death but by judgment of the senate, thereby openly assuming a power of putting any other of the Athenian citizens to death by their own authority. A glorious use they made of this new-assumed privilege; for as many as they conjectured to be no friends to the government in general, or to any of themselves in particular, they put to death, without cause, and without mercy. Theramenes openly opposing this, and absolutely refusing to concur in such measures, Critias accused him to the senate as a man of unsteady principles, sometimes for the people, sometimes against them, always for new things and state-revolutions. Theramenes owned, that he had sometimes changed his measures, but alleged that he had always done it to serve the people. He said that it was solely with this view he made the peace with Sparta, and accepted the office of one of the thirty: that he had never opposed their measures while they cut off the wicked; but, when they began to destroy men of fortune and family, then he owned he had differed with them, which he conceived to be no crime against the state.

168
Theramenes put to death.

While Theramenes was speaking, Critias withdrew, perceiving that the senate were thoroughly convinced of the truth of what Theramenes had said: but he quickly

returned with a guard, crying out, that he had struck Theramenes's name out of the list of the 3000; that the senate had therefore no longer cognizance of the cause, which the thirty had already judged, and condemned him to death. Theramenes perceiving that they intended to seize him, fled to the altar, which was in the midst of the senate-house, and laying his hands thereon, said, *I do not seek refuge here because I expect to escape death or desire it; but that, tearing me from the altar, the impious authors of my murder may interest the gods in bringing them to speedy judgment, and thereby restore freedom to my country.* The guards then haled him from the altar, and carried him to the place of execution, where he drank the poison with undaunted courage, putting the people in mind with his last breath, that as they had struck his name out of the 3000, they might also strike out any of theirs. His death was followed by a train of murders, so that in a short time 60 of the worthiest and most eminent citizens of Athens fell by the cruelty of the thirty. Amongst these, the most pitied was Niceratus, the son of Nicias; a man universally beloved for his goodness, and universally admired for his virtues. As for the Spartans, they, losing their former generosity, were extremely pleased with these things, and by a public decree commanded that such as fled from the thirty tyrants should be carried back bound to Athens: which extraordinary proceeding frightened all Greece; but the Argives and Thebans only had courage to oppose it: the former received the Athenian exiles with humanity and kindness; the latter punished with a mulct such of their citizens as did not rise and rescue the Athenian prisoners, who in pursuance of the Lacedæmonian decree were carried back through their territories.

Thrafsylbus, and such as with him had taken shelter in the Theban territory, resolved to hazard every thing, rather than remain perpetual exiles from their country; and though he had but 30 men on whom he could depend, yet considering the victories he had heretofore obtained in the cause of his country, he made an irruption into Attica, where he seized Phyla, a castle at a very small distance from Athens, where in a very short space his forces were augmented to 700 men; and though the tyrants made use of the Spartan garrison in their endeavours to reduce him and his party, yet Thrafsylbus prevailed in various skirmishes, and at last obliged them to break up the blockade of Phyla, which they had formed. The thirty and their party conceiving it very advantageous for them to have the possession of Eleusina, marched thither, and having persuaded the people to go unarmed out of their city, that they might number them, took this opportunity most inhumanly to murder them. The forces of Thrafsylbus increasing daily, he at length possessed himself of the Piræum, which he fortified in the best manner he could; but the tyrants being determined to drive him from thence, came down against him with the utmost force they could raise. Thrafsylbus defended himself with great obstinacy; and in the end they were forced to retreat, having lost before the place not only a great number of their men, but Critias the president of the thirty, another of the same body, and one who had been a captain of the Piræum.

When they came to demand the dead from Thrafsylbus, in order for their interment, he caused a crier

Attica.

169
Thrafsylbus seizes Phyla.

170
Critias killed.

Attica.

he had with him, to make a short speech in a very loud voice to the people, intreating them to consider, that as they were citizens of Athens without, so those against whom they fought, and those who fought to preserve themselves within the fort, were Athenian citizens also; wherefore, instead of thinking how to ruin and destroy their brethren, they ought rather to consult how all differences ought to be composed, and especially ought to rid themselves of those bloody tyrants, who, in the short time they had had the administration in their hands, had destroyed more than had fallen in the Peloponnesian war. The people, though moved by these discourses, differed among themselves; the consequence of which was, that they expelled the thirty, and chose ten men out of each tribe to govern in their stead, whereupon the tyrants retired to Eleusina. The citizens, however, though they changed the government, made no agreement with those in the Piræum; but sent away deputies to Sparta, as did also the tyrants from Eleusina, complaining, that the Athenians had revolted, and desiring their assistance to reduce them. The Spartans sent thereupon a large sum of money to encourage their confederates, and appointed Lyfander commander in chief, and his brother to be admiral; resolving to send sea and land forces to reduce Athens a second time; intending, as most of the Greek states suspected, to add it now to their own dominions. It is very probable that this design of theirs would have taken effect, if Pausanias king of Sparta, envying Lyfander, had not resolved to obstruct it. With this view, he procured another army to be raised against the Athenians, of which himself had the command, and with which he marched immediately to besiege the Piræum. While he lay before the place, and pretended to attack it, he entered into a private correspondence with Thrasybulus, informing him what propositions he should make in order to force the Lacedæmonians, who were suspected by their allies, to grant them peace.

The intrigues of Pausanias had all the success he could wish; the ephori who were with him in the camp concurred in his measures, so that in a short space a treaty was concluded on the following terms: That all the citizens of Athens should be restored to their houses and privileges, excepting the thirty, the ten which had succeeded them and who had acted no less tyrannically than they, and the eleven who during the time of the oligarchy had been constituted governors or keepers of the Piræum; that all should remain quiet for the future in the city; and that, if any were afraid to trust to this agreement, they should have free leave to retire to Eleusina. Pausanias then marched away with the Spartan army, and Thrasybulus at the head of his forces marched into Athens, where, having laid down their arms, they sacrificed with the rest of the citizens in the temple of Minerva, after which the popular government was restored. Yet quiet was not thoroughly established; the exiles at Eleusina having endeavoured by the help of money to raise an army of foreigners, by whose aid they might recover the authority they had lost: but first, depending on their friends in the city, they sent some of the principal persons amongst them as deputies, to treat with the citizens; but strictly instructed them to sow jealousies and excite disorders among them. This the latter quickly perceiving, put these persons to death; and then, communicating to those

at Eleusina, that these contentions would undoubtedly end either in their own or the destruction of their country, they offered immediately, to pass an act of oblivion, which they would confirm with an oath.

This being accepted, those who had withdrawn returned to the city, where all differences were adjusted, and both parties most religiously observed the agreement they had made, and thereby thoroughly resettled the state. In this whole transaction, the virtue of Thrasybulus deserves chiefly to be admired. When he first seized the castle of Phyla, the tyrants privately offered to receive him into their number instead of Theramenes, and to pardon at his request any 12 persons he should name: but he generously answered, That his exile was far more honourable than any authority could be, purchased on such terms; and by persisting in his design, accomplished, as we have seen, the deliverance of his country. A glorious deliverance it was; since, as Isocrates informs us, they had put 1400 citizens to death contrary to and without any form of law, and driven 5000 more into banishment, procuring also the death of Alcibiades, as many think, tho' at a great distance from them.

From this time to the reign of Philip of Macedon, the Athenians continued in a pretty prosperous situation, though they never performed any such great exploits as formerly. By that monarch, and his son Alexander, all Greece was in effect subdued; and the history of all the Grecian states from that time becomes much less interesting. Of the history of Athens from that time to the present, the following elegant abridgment is given by Dr Chandler †. "On the death of Alexander, the Athenians revolted, but were defeated by Antipater, who garrisoned Munychia. They rebelled again, but the garrison and oligarchy were reinstalled. Demetrius the Phaleræan, who was made governor, beautified the city, and they erected to him 360 statues; which, on his expulsion, they demolished, except one in the Acropolis. Demetrius Poliorcetes withdrew the garrison, and restored the democracy; when they deified him, and lodged him in the Opithodemos or the back part of the Parthenon, as a guest to be entertained by their goddess Minerva. Afterwards they decreed, that the Piræus, with Munychia, should be at his disposal; and he took the Museum. They expelled his garrison, and he was persecuted by Craterus a philosopher, to leave them free. Antigonus Gonatas, the next king, maintained a garrison in Athens: but, on the death of his son Demetrius, the people, with the assistance of Aratus, regained their liberty; and the Piræus, Munychia, Salamis, and Sunium, on paying a sum of money.

"Philip, son of Demetrius, encamping near the city, destroying and burning the sepulchres and temples in the villages, and laying their territory waste, the Athenians were reduced to solicit protection from the Romans, and to receive a garrison, which remained until the war with Mithridates king of Pontus, when the tyrant Aristion made them revolt.

"Archelaus, the Athenian general, unable to withstand the Roman fury, relinquished the *long walls*, and retreated into the Piræus and Munychia. Sylla laid siege to the Piræus, and to the city, in which Aristion commanded. He was informed, that some persons had been overheard talking in the Ceramicus, and blaming

Attica.

† 774
Virtue of
Thrasy-
bulus.

† *Travels
in Greece,
p. 28, &c.*

† 775
History of
Athens
from the
time of A-
lexander the
Great to the
present.

† 776
Athens be-
lieved and
taken by
Sylla.

Aristion for his neglect of the avenues about the Hep-tachalcos, where the wall was accessible. Sylla resolved to storm there, and about midnight entered the town at the gate called *Dipylon* or *the Piræan*; having levelled all obstacles in the way between it and the gate of the Piræus. Aristion fled to the Acropolis, but was compelled to surrender by the want of water; when he was dragged from the temple of Minerva, and put to death. Sylla burned the Piræus and Munychia, and defaced the city and suburbs, not sparing even the sepulchres.

"In the civil war, the Athenians took the side of Pompey. Cæsar generously refused to punish the city, which afterwards cared for his murderers. They next joined Antony, who gave them *Ægina* and *Cea*, with other islands. Augustus was unkind to them; and they revolted, four years before he died. Under Tiberius, the city was declining, but free, and regarded as an ally of the Romans. The high privilege of having a licitor to precede the magistrates, was conferred on it by Germanicus; but he was censured as treating with too much condescension a mixture of nations, instead of genuine Athenians, which race was then considered as extinct.

"The emperor Vespasian reduced Achaia to a province paying tribute and governed by a pro-consul. Nerva was more propitious to the Athenians; and Pliny, under Trajan his successor, exhorts Maximus to be mindful whither he was sent, to rule genuine Greece, a state composed of free cities. "You will revere the gods and heroes their founders. You will respect their pristine glory, and even their age. You will honour them for the famous deeds, which are truly, nay for those which are fabulously, recorded of them. Remember, it is Athens you approach." This city was now entirely dependent on Rome, and was reduced to sell Delos and the islands in its possession.

"Hadrian, who was at once emperor and an archon of Athens, gave the city laws, compiled from Draco, Solon, and the codes of other legislators; and displayed his affection for it by unbounded liberality. Athens re-flourished, and its beauty was renewed. Antoninus Pius, who succeeded, and Antoninus the Philosopher, were both benefactors.

"The barbarians, in the reign of Valerian, besieging Thessalonica, all Greece was terrified, and the Athenians restored their city-wall, which had been dismantled by Sylla, and afterwards neglected.

"Under the next emperor, who was the archon Gallienus, Athens was besieged; the archontic office ceased; and the Strategus or general, who had before acted as overseer of the agora or market, then became the supreme magistrate. Under Claudius, his successor, the city was taken, but soon recovered.

"It is related, that Constantine, when emperor, gloried in the title of *general of Athens*; and rejoiced exceedingly on obtaining from the people the honour of a statue with an inscription, which he acknowledged by a yearly gratuity of many bushels of grain. He conferred on the governor of Attica and Athens the title of *grand duke*, *μεγας δουξ*. That office was at first annual, but afterwards hereditary. His son Constantine bestowed several islands on the city, to supply it with corn.

"In the time of Theodosius the First, 380 years after Christ, the Goths laid waste Thessaly and Epirus;

but Theodore, general of the Achæans, by his prudent conduct preserved the cities of Greece from pillage, and the inhabitants from being led into captivity. A statue of marble was erected to him at Athens by order of the city; and afterwards one of brass, by command of the emperor, as appears from an inscription in a church dedicated to a faint of the same name, not far from the French convent. It is on a round pedestal, which supports a flat stone serving for the holy table. Endocia the wife of Theodosius the Second was an Athenian.

"The fatal period now approached, and Athens was about to experience a conqueror more savage even than Sylla. This was Alaric, king of the Goths; who, under the emperors Arcadius and Honorius, over-ran Greece and Italy, sacking, pillaging, and destroying. Then the Peloponnesian towns were overturned, Arcadia and Lacedæmon were laid waste, the two seas by the Isthmus were burnished with the flames of Corinth, and the Athenian matrons were dragged in chains by barbarians. The invaluable treasures of antiquity, it is related, were removed; the stately and magnificent structures converted into piles of ruin; and Athens was stripped of every thing splendid or remarkable. Synesius, a writer of that age, compares the city to a victim, of which the body had been consumed, and the hide only remained.

"After this event, Athens became an unimportant place, and as obscure as it once had been famous. We read that the cities of Hellas were put into a state of defence by Justinian, who repaired the walls, which at Corinth had been subverted by an earthquake, and at Athens and in Bœotia were impaired by age; and here we take a long farewell of this city. A chain of near 700 years ensues in its history, except that, about the year 1130, it furnished Roger the First king of Sicily with a number of artificers, whom he settled at Palermo, where they introduced the culture of silk, which then passed into Italy. The worms had been brought from India to Constantinople in the reign of Justinian.

"Athens, as it were, re-emerges from oblivion in the 13th century, under Baldwin, but besieged by a general of Theodorus Lascaris, the Greek emperor. It was taken in 1427 by Sultan Morat. Boniface, marquis of Monterrat, possessed it with a garrison; after whom it was governed by Delves, of the house of Aragon. On his death, it was seized, with Macedonia, Thessaly, Bœotia, Phocis, and the Peloponnesus, by Bajazet; and then, with the island Zante, by the Spaniards of Catalonia in the reign of the Greek emperor Andronicus Palæologus the elder. These were disposed of by Reinerius Acciaïoli, a Florentine; who, leaving no legitimate male issue, bequeathed it to the state of Venice. His natural son, Antony, to whom he had given Thebes with Bœotia, expelled the Venetians. He was succeeded in the dukedom by his kinsman Nerius, who was displaced by his own brother named *Nerius*, but recovered the government when he died. Nerius leaving only an infant son, was succeeded by his wife. She was ejected by Mahomet on a complaint from Francus the son of the second Antony, who confined her at Megara, and made away with her; but, her son accusing him to Mahomet the Second, the Turkish army under Omar advanced, and he surrendered the citadel in 1455; the Latins refusing to succour him, unless the Athenians would embrace their religious tenets. Mahomet,

177
By Alaric
the Goth.

178
By the
Turks.

Atties.

it is related, when he had finished the war with the despot of the Morea, four years after, surveyed the city and Acropolis with admiration. The janifaries informed him of a conspiracy; and Fraucus Acciaioli, who remained lord of Beotia, was put to death. In 1464 the Venetians landed at the Piræus, surpris'd the city, and carried off their plunder and captives to Eubœa.

"It is remarkable, that after these events Athens was again in a manner forgotten. So lately as about the middle of the 16th century, the city was commonly believed to have been utterly destroyed, and not to exist, except a few huts of poor fishermen. Crusius, a learned and inquisitive German, procured more authentic information from his Greek correspondents residing in Turkey, which he published in 1584, to awaken curiosity and to promote farther discoveries. One of these letters is from a native of Nauplia, a town near Argos in the Morea. This writer says, that he had been often at Athens, and that it still contained many things worthy to be seen, some of which he enumerates, and then subjoins, "But why do I dwell on this place? It is as "the skin of an animal, which has been long dead."

It now remains to give some idea of the character, government, and religion of this once so famous people.

The Athenians, says Plutarch, are very subject to violent anger; but they are soon pacified. They are likewise easily impressed with humanity and compassion. That this was their temper, is proved by many historical examples. We shall produce a few: The sentence of death pronounced against the inhabitants of Mitylene, and revoked the next day: The condemnation of Socrates, and that of the ten chiefs, each followed by quick repentance and most pungent grief.

The minds of the same people, adds Plutarch, are not formed for laborious researches. They seize a subject, as it were by intuition; they have not patience and phlegm enough to examine it gradually and minutely. This part of their character may seem surprising and incredible. Artisans, and other people of their rank, are in general slow of comprehension. But the Athenians of every degree were endowed with an inconceivable vivacity, penetration, and delicacy of taste. Even the Athenian soldiers could repeat the fine passages of the tragedies of Euripides. Those artisans and those soldiers assisted at public debates, were bred to political affairs, and were equally acute in apprehension and in judgement. We may infer the understanding of the hearers of Demosthenes from the genius of his orations, which were laconic and poignant.

As their inclination, continues Plutarch, leads them to assist and support people of low condition, they like discourse seasoned with pleasantry, and productive of mirth. The Athenians patronize people of low degree; because from them their liberty is in no danger, and because such patronage tends to support a democratical constitution. They love pleasantry; which turn of mind proves that they are a humane social people, who have a taste for raillery and wit, and not soured with that reserve which marks the despot or the slave.

They take pleasure in hearing themselves praised; but they can likewise patiently bear raillery and censure. We know with what art and success Aristophanes and Demosthenes applied their praise and their

irony to the Athenian people. When the republic enjoyed peace, says the same Plutarch in another place, it encouraged the adulation of its orators: but when it had important affairs to discuss, when the state was in danger, it became serious; and preferred, to its eloquent sycophants, the honest orators who opposed its follies and its vices; such ingenious and bold patriots as a Pericles, a Phocion, and a Demosthenes.

The Athenians, continues Plutarch, often make their governors tremble, and shew great humanity to their enemies. They were very attentive to the information and instruction of those citizens who were most eminent for their policy and eloquence; but they were on their guard against the superiority of their talents, they often checked their boldness, and repressed their exuberant reputation and glory. That this was their temper, we are convinced by the ostracism; which was established to restrain the ambition of those who had great talents and influence, and which spared neither the greatest nor the best men. The detestation of tyranny and of tyrants, which was inherent in the Athenians, rendered them extremely jealous of their privileges, made them zealous and active in defence of their liberty, whenever they thought it was violated by men in power.

As to their enemies, they did not treat them with rigour. They did not abuse victory by a brutal inhumanity to the vanquished. The act of amnesty, which they passed after the usurpation of the thirty tyrants, proves that they could easily forgive injuries.

It was this mildness, this humanity of disposition, which made the Athenians so attentive to the rules of politeness and decorum. In their war with Philip, having seized one of his couriers, they read all the letters he bore, except one from Olympias to her husband, which they sent back unopened. Such was their veneration of love and conjugal secrecy; those sacred rights which no enmity, no hostility, warrants us to violate!

The taste of the Athenians for all the arts and sciences is too well known to need a particular relation. The views of conquest cherished by a small republic, were extensive and astonishing; but this people, so great, so ambitious in their projects, were, in other respects, of a different character. In the expences of the table, in dress, in furniture, in houses, in short, in private life, they were frugal, simple, modest, poor; but sumptuous and magnificent whenever the honour of the state was concerned. Their conquests, their victories, their riches, their connections with the inhabitants of Asia Minor, never reduced them to luxury, to riot, to pomp, to profusion. Xenophon remarks, that a citizen was not distinguished from a slave by his dress. The wealthiest citizen, the most renowned general, was not ashamed to go himself to market.

We shall finish this picture of the Athenians by the addition of one object more, to which every one will admit they have a right; an object which was prominent and striking, in all their actions and in all their enterprises: We mean their ardent love of liberty. This was their predominant quality; the main spring of their government. From the beginning of the Persian war, they sacrificed every thing to the liberty of Greece. They left, without hesitation, their cities, their houses, to fight at sea the common enemy, from

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whom they were in danger of servitude. What a glorious day was it for Athens, when all her allies, growing flexible to the advantageous offers which were made to them by the king of Persia, the reply by Aristides, to the ambassadors of that monarch,—“That it was impossible for all the gold in the world to tempt the republic of Athens: to prevail with her to sell her liberty, and that of Greece.” It was by these generous sentiments that the Athenians not only became the bulwark of Greece, but likewise guarded the rest of Europe from a Persian invasion.

These great qualities were blended with great failings, seemingly incompatible with patriotism. For the Athenians, notwithstanding their tenacious jealousy of the rights of their country, were a volatile, inconstant, capricious people.

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Religion.

There never was a people more attentive to the worship of the gods than the Athenians. The worship of their principal deities was diffused over all Greece, and even beyond its limits.

Each temple had its particular religious rites: the pomp, the ceremonies, the duration, and the succession of the solemn feasts, were all appointed by fixed rules. The worship paid to each divinity, whether public or private, was founded on traditions, or on laws constantly obeyed. The feast of Bacchus, the Panathenæa, the feast of the mysteries of Eleusis, were celebrated according to established rules, most of which were as ancient as the feasts themselves. The old customs, of which the priests were the guardians, were observed in the temples. It is probable that the priests were consulted on affairs in which the worship of a deity was interested, and that their answer was decisive. We are certain that the Eumolpidae had this authority. They were the interpreters of the ancient laws on which the worship of Ceres was founded, its magnificence, and its mode—laws which were not written, as Lyfias informs us, but were perpetuated by a constant observation. The abuses which had gradually crept into the celebration of those feasts, had given rise to several new regulations; to that of the orator Lycurgus, for example, and to the law of Solon, which enjoined the senate to repair to Eleusis on the second day of the feast: but neither these nor the other particular regulations which we find in Samuel Petit's collection of Attic laws, could make a religious code. There was no general system which comprehended all the branches of their religion, which, by combining all its articles, might regulate their belief and conduct, and direct the judges in their decisions.

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Crimes against religion why sometimes punished with severity.

Crimes against religion were only punished as they affected the state; and consequently they were tried by the magistrate. Mere raillery, though somewhat profane, was thought productive of no worse consequence than offending the ministers of the gods. The Athenians acknowledged no other religion than the hereditary public worship; no other gods than those they had received from their ancestors; no other ceremonies than those which had been established by the laws of the state, and practised by their country from time immemorial. They were only solicitous to preserve this worship, which was closely interwoven with their government, and made a part of its policy. They were likewise attentive to the ceremonial pomp: because order, the regular vigour of legislation, depends greatly

on the awe impressed by externals. But as to the inconsistent and monstrous romance of fables, foreign opinions, popular traditions, and poetical fictions, which formed a religion quite different from that of the state—in it they were very little interested, and allowed every one to think of it as he pleased.

This explanation will reconcile a seeming contradiction in the conduct of the Athenians, who gave great licence to their poets, and severely punished the citizens who were guilty of impiety. Aristophanes, who made as free with the gods as with the great, was applauded by the Athenians. They condemned Socrates to death, who revered the deity, but disapproved the public manner of worshipping him. The life of Æschylus was in danger from a suspicion that he had revealed some of the secrets of Eleusis in one of his pieces. The wit of Aristophanes's drama was unpunished.

The priests were not confined to the care of the altars; they who were vested with the sacerdotal dignity, which was only incompatible with professions merely useful and lucrative, might likewise hold the most important offices of the commonwealth. This we could prove by a great number of examples; we shall cite that of Xenophon, the illustrious historian and philosopher: he was likewise a famous general, and he was a priest. He was performing the sacerdotal function when he received the news of his son's death, who was killed at the battle of Mantinea.

The sacred ministry was not only compatible with civil offices, but likewise with the profession of arms. The priest and the soldier were often blended. Callias, the priest of Ceres, fought at Plataea. This custom was not peculiar to the Athenians. The Lacedæmonians, after the battle which we have just mentioned, made three graves for their slain; one for the priests, one for the other Spartans, and one for the Helots.

As every mean employment was incompatible with the sacerdotal dignity, the priests had a revenue fixed to their office. We know that a part of the victims was their right, and that apartments were assigned them near the temples. But, beside these advantages, they had a salary proportioned to the dignity of their functions and to the rank of the deities whom they served. Their salary was probably paid from the revenue of the temples. Those revenues, which kept the temples in repair, and defrayed the sacrificial expences, were very considerable. They were of many different kinds.

A great part of the sacred revenues arose from fines, which individuals were condemned to pay for various offences; fines, of which the tenth part was appropriated to Minerva Polias, and the fifth to the other gods and to the heroes whose names their tribes bore. Besides, if the Prytanes did not hold the assemblies conformably with the laws, they were obliged to pay a fine of 1000 drachms to the goddess. If the Proedri, *i. e.* the senators whose office it was to lay before the assembly the matters on which they were to deliberate, did not discharge that duty according to the rules prescribed to them, they were likewise condemned to pay a fine, which, as the former, was applied to the use of Minerva. By these fines her temple must have been greatly enriched.

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Priests their duty.183
Sacred revenues, &c.

Besides this revenue, which was the common property of the gods, and which varied according to the number and degrees of the misdoers, the temples had their permanent revenues: We mean the produce of the lands which were consecrated to the deities. We do not here allude to the lands consecrated to the gods, which were never to be cultivated; such as the territory of Cirrha, proscribed by a solemn decree of the Amphictyons; the land betwixt Megara and Attica, which was consecrated to the goddesses of Eleusis, and many others. We would speak only of those which were cultivated, the fruits of which enriched the temples.

There were likewise lands belonging to the state, the produce of which was destined to defray the expence of the sacrifices which were offered in the name of the republic. There were likewise first-fruits which the public officers levied on all lands, for the use of the gods. All these emoluments made a part of the revenue of the temples.

The gods, beside the revenues immediately appertaining to their temples, had certain rights which were granted them by particular compact. The Lepreates, for instance, were obliged to pay every year a talent to Olympian Jupiter, on account of a treaty of alliance which they made with the Eleans in one of their wars. The inhabitants of Epidaurus, to obtain leave from the Athenians to cut down olive-trees for statues, which the Pythian priests had commanded them to make, engaged to send deputies every year to Athens, to offer sacrifices in their name to Minerva and to Neptune. But this prerogative was rather honorary than lucrative.

The tenth part of the spoils taken in war was likewise the property of Minerva. Sacred vessels were bought with the effects of the 30 tyrants. In short, the gods were profited by almost every public accident. But what contributed most to enrich the famous temples of Greece was the money which was constantly brought to them by individuals, in consequence of vows they had made, or to pay for sacrifices which were offered in their names. The credulity of the people was an inexhaustible fund. That credulity enriched the temples of Delphi and Eleusis, and supported the magnificence of Delphi. And those immense treasures which were the fruit of superstition, were often a prey to avarice.

These revenues were not deposited with the priests; nor did they expend them. A moderate salary was all their gain; and to offer sacrifices to the deities whose ministers they were, was all their employment.

It is very probable that all the sacred revenues were paid into the hands of officers who were appointed to receive them, and who were to give an account of the discharge of their trust. Nay, we cannot doubt of this, after reading a passage in Aristotle, who, speaking of the officers of the temples, expressly mentions those who were entrusted with the money appertaining to the gods. Citizens, without doubt, of approved integrity, were chosen to this office; and their duty must have been, to keep the temples in repair and order, and to disburse and keep an account of the ordinary sacred expences.

As to the solemn feasts, which were incredibly magnificent, such as the feast of Bacchus, and the Pana-

thenæa, they were celebrated at the expence of the Chœregus; i. e. of the chief of the choir of each tribe: for each tribe had its poet and its musicians, who sung, emulating each other, hymns in honour of the deity. The richest citizens were appointed chiefs of the different choirs; and as their office was very expensive, to indemnify them in some degree, the Chœregus of the victorious tribe had the privilege of engraving his name on the tripod which that tribe suspended to the roof of the temple. This office, though ruinous, was eagerly solicited; and naturally, in a republican state. It led to honours, like the Curule dignity at Rome; and it greatly tended to ingratiate its possessor with a people who were more affected with pleasures than with essential services, and who, consequently, would more highly esteem a profuse Chœregus than a victorious general.

With regard to the fines, which were in the whole, or in part, the property of Minerva and of the other deities, there were at Athens public treasurers appointed to receive them. They were ten in number, and they were nominated by lot. They were called *Treasurers of the Goddess, or Receivers of the sacred money*. That money they received in the presence of the senate; and they were empowered to diminish or to annihilate the fine, if they thought it unjust. The statue of Minerva, that of the victories, and the other invaluable pledges of the duration of the state, were deposited with them.

The treasury in which the money consecrated to the gods was kept, was in the citadel, behind the temple of Minerva Polias; and from its situation it was termed *Opistodomus*. It was surrounded with a double wall. It had but one door, the key of which was kept by the Epitates, or chief of the Prytanes: his dignity was very considerable; but it lasted only one day. In this treasury a register was kept, in which were written the names of all those who were indebted to the state: he who owed the smallest fine was not omitted. If the debtors proved insolvent, they were prosecuted with extreme rigour, and often punished with a cruelty which religion could not excuse; though the interest of the gods was the motive, or rather the pretext. The sacred treasurers held a considerable rank among the magistrates, who received the public finances. Of these magistrates there were many kinds, as there were many sorts of revenues.

The Athenian priests did not compose an order distinct and separate from the other orders of the state. They did not form a body united by particular laws, under a chief whose authority extended to all his inferiors. The dignity of sovereign pontiff was unknown at Athens; and each of the priests served his particular temple, unconnected with his brethren. The temples, indeed, of the principal deities; those of Minerva, for instance, of Neptune, of Ceres, and of Proserpine, had many ministers; and in each of them a chief presided, who had the title of *High-priest*. The number of subaltern ministers was in proportion to the rank of the deity; but the priests of one temple were altogether a separate society from those of another. Thus at Athens there was a great number of high-priests, because many deities were worshipped there, whose service required many ministers. The power of each priest was confined to his temple; and there was no sovereign.

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vereign pontiff, the minister-general of the gods, and the president at all the feasts.

It naturally follows from this account, that the ministers of the gods at Athens were not judges in matters of religion. They were neither authorized to take cognizance of crimes committed against the deity, nor to punish them. Their function was to offer sacrifices to the gods, and to intreat their acceptance of the adorations of the people. But the punishment of impiety; of sacrilege, of the profanation of mysteries, and of other irreligious crimes, was not entrusted to their zeal.

The priests were not only incapable of avenging crimes against religion by a temporal process; they even could not, without an express order either from the senate or the people, exercise their right of devoting criminals to the infernal gods. It was in consequence of a civil sentence pronounced against Alcibiades, that the Eumolpidae lanced their anathema against him. It was in virtue of another decree that they revoked their imprecations, when his countrymen wanted his service, and therefore restored him to their favour.

Religious causes, according to M. de Bougainville, fell under the jurisdiction of the Heliasts.

The government, though often altered, continued pretty much on the plan established by Solon.

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People divided into different tribes, &c.

The people of Athens were freemen, sojourners, or slaves. The citizens, called in Greek *Politai*, were very numerous; but, what may seem strange, were as many in the time of Cærops, as in the most flourishing state of the commonwealth, hardly ever exceeding 20,000. It was Solon who decreed that none should be accounted free but such as were Athenians both by father and mother. After his time it fell into disuse, till revived by Pericles, and again at his instance repealed. After the expulsion of the 30 tyrants, Solon's law was restored. A person born of a stranger was styled *Nothos*, a bastard; whereas the son of a free woman was called *Gnesios*, i. e. *legitimate*. There was in Cynosarges a court of judicature, to which causes of illegitimacy properly belonged; and the utmost care was taken to prevent any from being enrolled Athenian citizens, who had not a clear title thereto. The citizens were divided by Cærops into four tribes: the first called *Cæropes*, from Cærops; the second, *Autochthon*, from a king of that name; the third, *Alcæi*, from Alcæus another king of Athens, or rather from *Alcæ* which signifies a *shore*; the fourth, *Purallia*: these names were altered by Crænaus, and again by Erichonius. In the reign of Erichonius, they were again changed; the soldiers were called *Opitai*, the craftsmen *Ergatai*, the farmers *Georgoi*, the graziers and shepherds *Agicorai*: in this state they were when Solon settled the commonwealth, and appointed the senate to be composed of 400, 100 out of each tribe. Clisthenes increased the number of the tribes to 10; and made the senate consist of 500, taking 50 out of each tribe. In succeeding times, two other tribes were added. Each tribe was subdivided into its *Demoi* or wards; and with respect to these it was that Solon instituted the public feasts before-mentioned, at which sometimes the whole tribe assembled, sometimes several wards, and sometimes only the inhabitants of one ward.

The second sort of inhabitants we mentioned were called *Metœcoi*, i. e. *sojourners*; these were persons

who lived always at Athens, yet were not admitted free denizens; as for such as did not constantly reside in Athens, they were styled *Xenoi*, i. e. *strangers*. The sojourners were obliged to chuse out of the citizens protectors, who were styled *Patrons*: they paid services to the state, and besides these an annual tribute of 12 drachms for every man, and six for every woman; but such as had sons, and paid for them, were exempted. If people fell to poverty, and were not able to pay the tribute, they were seized by the tax-masters, and actually sold for slaves; which, as Dionege Laertius tells us, was the fate of Xenocrates the philosopher. The sojourners in Attica were under the same law as those in Athens. As to servants, they were freemen, who through indigency were driven to receive wages, and while they were in this state had no vote in the assembly. As to slaves, they were absolutely the property of their masters, and as such were used as they thought fit: They were forbidden to wear clothes, or to cut their hair like their masters; and, which is indeed amazing, Solon prohibited them to love boys, as if that had been honourable: They were likewise debarred from anointing or perfuming themselves, and from worshipping certain deities: They were not allowed to be called by honourable names; and in most other respects were used like dogs. They stigmatized them at their pleasure, that is, branded them with letters in the forehead and elsewhere. However, Theseus's temple was allowed them as a sanctuary, whither, if they were exceedingly ill used, they might fly, and thereby oblige their owners to let them be transferred to another master. In this and many other respects the Athenian slaves were in a much better condition than those throughout the rest of Greece: they were permitted to get estates for themselves, giving a small premium to their masters, who were obliged to make them free if they could pay their ransom; they likewise obtained the same favour from the kindness of their masters, or for having rendered military services to the state. When they were made free, they were obliged to choose patrons; and had likewise the privilege of choosing a curator, who, in case their patrons injured them, was bound to defend them.

The general assembly of the people, which Solon made the dernier resort, was called the *Ecclesia*; and consisted of all the freemen of Athens, excepting such as were *atimoi* or infamous. The meetings of these assemblies were either ordinary or extraordinary. The ordinary were such as were appointed by law, the extraordinary such as necessity required. Of the first there were four in 35 days. In the first assembly they approved or rejected magistrates, heard proposals for the public good, and certain causes. In the second they received petitions, and heard every man's judgment on the matters that were before them. In the third they gave audience to foreign ambassadors. The fourth was employed altogether in affairs relating to the gods and their worship. The extraordinary meetings were appointed by the magistrates when occasion required, whereas to the ordinary assemblies the people came of their own accord. The first were held either in the market-place, in the Pnyx a place near the citadel, or in the theatre of Bacchus; as to the latter, the magistrates who appointed the extraordinary meeting appointed also the place where they should be held.

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General assembly of the people

titia. If any sudden tempest rose, or any earthquake happened, or any sign notoriously inauspicious appeared, the assembly was immediately adjourned, to prevent the people from apprehending unhappy consequences from their deliberations. But if the weather was fair and serene, and nothing happened out of the ordinary course of things, they proceeded to purify the place where the assembly was held, which was done by sprinkling it round with the blood of young pigs: then the crier made a solemn prayer for the prosperity of the republic, and that heaven would bestow a happy issue on their counsels and undertakings; he then pronounced a bitter execration against any who should in that assembly propound what might be disadvantageous to the state. These ceremonies being over, they proceeded to business.

There were several magistrates who had the overseeing and regulating these assemblies. These were, first, the Epitæte, or president of the assembly, who was chosen by lot out of the Proedri: his office was to give the signal for the people's voting. Next to him were the Prytanes, *i. e.* a committee of the senate, who of course were present on this occasion: by their order a programma, or scheme of the business to be proposed at the assembly, was previously set up in some public place, that every man might know what business to apply his thoughts to. The Proedri were nine in number, appointed by lots out of all the tribes to which the Prytanes did not belong: they had the right of proposing to the people what they were to deliberate upon, and their office ended with the assembly; there sat with them assessors, who were to take care that nothing they proposed was detrimental to the commonwealth. The first step to business was the crier's reading the decree of the senate whereon the assembly was to deliberate: when he had finished this, he made proclamation in these words: *Who of the men above 50 will make an oration?* When the old men had done speaking, the crier made proclamation again that any Athenian might then offer his sentiments, whom the law allowed so to do; that is, all such as were above 30 years old, and were not infamous. If such a one rose up to speak, the Prytanes interposed, and bid him be silent; and if he did not obey them, the lictors pulled him down by force. When the debates were over, the president permitted the people to vote; which they did by casting first beans, but in after-times pebbles, into certain vessels: these were counted, and then it was declared that the decree of the senate was either rejected or approved; after which, the Prytanes dismissed the assembly.

87. accurate. The senate was instituted by Solon to prevent the dangerous consequences of leaving the supreme power in the people. At the time of his institution, it was to consist of 400, 100 out of each tribe; it was increased to 500, when the tribes were augmented to 10; and when they came to 12, it was also swelled to 600. They were elected by lots after this manner: At a day appointed, towards the close of the year, the president of each tribe gave in a list of such persons belonging thereto, as were fit for and desired to appear for this dignity: these names were engraven on tablets of brass, and a number of beans equal to the number of the amount of them, among which were 100 white ones, put into a vessel; and then the names of the candidates and the beans were drawn one by one, and such as were

drawn by the white beans were received into the senate. After the senate was elected, they proceeded to appoint the officers who were to preside in the senate; these were the Prytanes before-mentioned, and they were elected thus: The names of the ten tribes were thrown into one vessel, and nine black beans and a white one into another vessel. Then the names of the tribes were drawn with the beans. The tribe to which the white bean answered, presided first; and the rest according to the order in which they were drawn.

The Prytanes, while the senate consisted of 500, were 50 in number. For the farther avoiding of confusion therefore, 10 of these presided a week, during which space they were called *Proedri*; and out of these an Epitæte or president was chosen, whose office lasted but one day, and by law no man could hold it more than once: the reason of this was, that he had in his custody the public seal, the keys of the citadel, and the charge of the exchequer. The reader must distinguish between the Epitætes and Proedri last-mentioned, and those spoken of in the former paragraph, because, though their titles were the same, their office were perfectly distinct. The senate assembled by direction of the Prytanes once every day, excepting festivals, and sometimes oftener, in the senate-house, which was thence called *Prytaneum*.

When a member of the senate made a motion for a new law, it was immediately engraven on tablets, that the members when they came next might be prepared to speak to it. At the subsequent assembly the Epitætes opened the matter, after which every senator that pleased delivered his sentiments; then any of the Prytanes drew up the decree, and repeated it aloud: after which they proceeded to vote, and if there was a majority of white beans, then it became *psophisma*, and was afterwards propounded to the people: if they approved it, it became a law; otherwise it was of no force longer than the senate who decreed it subsisted. The power of the senate was very great: for they took the account of magistrates at the expiration of their offices; they directed the provisions made for poor citizens out of the public treasure; they had the superintendancy of public prisons, and a power of punishing such as committed acts morally evil, though not prohibited by any law; they had the care likewise of the fleet; and besides all these they had many other branches of authority, which it is not necessary for us to mention. Before they took their seats, they were constrained to undergo a very strict examination, wherein the whole course of their lives was inquired into; and if the least slur on their reputation appeared, they were set aside. When this examination was over, they took an oath, whereby they bound themselves to promote in all their councils the public good, to advise nothing contrary to the laws, and to execute their functions exactly. The highest fine the senate could impose was 500 drachms: if they thought the offender deserved a heavier mulct, they then transmitted the cause to the *Thesmothetæ*, who punished them as they thought fit. The senators, when their year was out, gave an account of their management to the people: but that they might have the less to do, they always punished such of their number as they found had offended, by expulsion; and in this they were mighty exact. Yet an expelled senator was notwithstanding eligible to any other office, the most trivial

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Prytanes.

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Laws how established, &c.

Attica. trivial omission being sufficient to occasion a diminution from the senatorial dignity; and therefore, when the tribes chose their senators, they also chose a certain number of subsidiaries, out of which, when a senator was expelled, another was substituted in his place. Each senator was allowed a drachm every day: for it was a constant rule with the Athenians, that the public ought to pay for every man's time; and therefore such of the poor Athenians as thought fit to demand it, had three oboli for going to the assembly. If during their administration any ships of war were built, the senators had crowns decreed them; but if not, they were forbidden to sue for them.

Next to the senate was the court of *Areopagus*, for a description of which see that article.

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Archons,
Nomophylaces, &c.

The chief magistrates of Athens were Archons, and inferior to them there were many others; of whom it will be necessary to mention some. In the first place they had Nomophylaces, who were also styled *the eleven*, because they were so many in number, one chosen out of each tribe, and a clerk or secretary who made up the eleven. Their duty it was to look to the execution of the laws: they had authority to seize robbers and other capital offenders; and if they confessed, to put them to death. Dr Potter thinks they resembled our sheriffs. The Phylarchi were the presidents of the Athenian tribes; but in time this became a military title. The Philobasilus was an officer in each tribe, who did the same things within his jurisdiction as the Basilus did with respect to the state. The Demarchi were the principal magistrates in wards. The Lexarchi were six in number, and were bound to take care that the people came duly to the assemblies; in their custody was the public register of the citizens names. They had under them *Toxotæ*, who were lictors or bailiffs; they were sometimes 1000 in number: these men were necessary; but, like most of their sort, were in a manner infamous, as may be gathered from the comedies of Aristophanes; they were generally Scythians, raw-boned, brawny fellows, ready to execute any thing they were commanded. The Nomothetæ were 1000 in number; their business was to watch over and inspect into the laws. There were two sorts of orators in the service of the state. Some were appointed to defend an old law, when a motion was made to repeal it; these had their fee from the state, but the same man was incapable of being elected twice. Besides these, there were 10 settled orators called *Rhetores*, elected by lot; their business was to plead public causes in the senate-house. For this they had their stated fees; and with respect to their qualifications, the laws run thus: "Let no one be a public orator who hath struck his parents, denied them maintenance, or shut them out of his doors; who hath refused to serve in the army; who hath thrown away his shield; who hath been addicted to lewd women, notoriously effeminate, or has run out his patrimony. If any man who has been guilty of these crimes dare to deliver an oration, let him be brought to trial upon the spot. Let an orator have children lawfully begotten, and an estate within Attica; if in his oration he talks impertinently, makes idle repetitions, affects an unbecoming rallery, digresses from the point in question, or, after the assembly is over, abuses the president, let the *Proedri* fine him 50 drachmæ; and if

that is not thought enough, let him be brought before the next assembly and fined again."

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Courts
justice.

We shall conclude this draught of the Athenian government with an account of their courts of justice, which, exclusive of the *Areopagus*, were 10 in number; four had cognizance of criminal, and six of civil causes. These 10 courts were numbered with the 10 first letters of the alphabet, and were thence styled, *Alpha, Beta, Gamma*, &c. When an Athenian was at leisure to hear causes, he wrote his own name, that of his father, and the ward to which he belonged, upon a tablet; this he presented to the *Thesmothetæ*, who returned it again to him with another tablet, with the letter which fell to his lot; then he went to the crier of the court, who presented him a sceptre, and gave him admission. When the causes were over, every judge went and delivered his sceptre to the *Prytanes*, and received a stated fee for every cause that was tried. But as this was intended only to compensate their loss of time, so that there might be no appearance of covetousness, a man was forbid to sit in two courts on the same day. The first criminal court after the *Areopagus*, was that of the *Ephete*. It consisted of 51 members, all upwards of 51 years old. Draco gave it a very extensive jurisdiction; but Solon took away from them the power of judging in any other causes than those of manslaughter, accidental killing, and lying in wait to destroy: the Basilus entered all causes in this court. The second criminal court was called *Delphinium*, because it was held in the temple of Apollo Delphinus; it had cognizance of such murders as were confessed by the criminal, but at the same time justified under some pretence or other. The *Prytaneum* was the third criminal court. It held plea of such cases where death ensued from inanimate things: causes were heard here with the same solemnity as in other courts; and on judgment given, the thing, whatever it was, that had occasioned the death of a man, was thrown out of the territory of Athens. The last criminal court was styled *Preatum*. It sat in a place not far from the sea-shore; and such persons were brought before this court, as had committed murders in their own country and fled to Attica: the proceedings of this court were so severe, that they did not permit the criminal to come on shore, but obliged him to plead his cause in his vessel; and if he was found guilty, he was committed to the mercy of the winds and seas.

Of the judicatures for hearing civil causes, the first was the *Paragastion*, so called, as some think, because in it no matter could be heard if the cause of action was above one drachm. The *Cainon*, or new court, was the second tribunal. The third was styled the court of *Lycus*, because it assembled in a temple dedicated to that hero, whose statue, represented with the face of a wolf, was set up in all courts of justice. The *Trigonon* was so called, because it was triangular in its form. The court *Melidius* derived its appellation from the architect who built it. The sixth and last court was called *Heliaa*; it was by far the greatest, and is generally conceived to have derived its name from the judges sitting in the open air exposed to the sun. All the Athenians who were free citizens were allowed by law to sit in these courts as judges; but before they took their seats were sworn by Apollo Patrius, Ceres, and

Atticus
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Attorney.

and Jupiter the king, that they would decide all things righteously and according to law, where there was any law to guide them, and by the rules of natural equity, where there was none. The Helæstic court consisted at least of 50, but its usual number was 500, judges: when causes of very great consequence were to be tried, 1000 sat therein; and now and then the judges were increased to 1500, and even to 2000. There were many inferior courts in Athens for the decision of trivial causes; but of these there is no necessity of speaking, since we design no more than a succinct view of the Athenian republic, as it was settled by and in consequence of Solon's laws.

ATTICUS (Titus Pomponius), one of the most honourable men of ancient Rome. He understood the art of managing himself with such address, that, without leaving his state of neutrality, he preserved the esteem and affection of all parties. His strict friendship with Cicero did not hinder him from having great intimacy with Hortensius. The contests at Rome between Cinna's party and that of Marius induced him to go to Athens, where he continued for a long time. He was very fond of polite learning, and kept at his house several librarians and readers. He might have obtained the most considerable posts in the government; but chose rather not to meddle, because in the corruption and faction which then prevailed he could not discharge them according to the laws. He wrote Annals. He married his daughter to Agrippa; and attained to the age of 77.

ATTILA, king of the Huns, surnamed *the scourge of God*, lived in the 5th century. He may be ranked among the greatest conquerors, since there was scarcely any province in Europe which did not feel the weight of his victorious arms. See HUNS.

ATTIRE, in hunting, signifies the head or horns of a deer. The attire of a stag, if perfect, consists of bur, pearls, beam, gutters, antler, fur-antler, royal, fur-royal, and crotches; of a buck, of the bur, beam, brow-antler, advancer, palm, and spellers.

ATTITUDE, in painting and sculpture, the gesture of a figure or statue; or it is such a disposition of their parts as serves to express the action and sentiments of the person represented.

ATTLEBURY, a town in the county of Norfolk in England. E. Long. o. 40. N. Lat. 52. 23.

ATTOLLENS, in anatomy, an appellation given to several muscles otherwise called *levator* and *elevator*. See ANATOMY, *Table of the muscles*.

ATTORNEY at Law answers to the procurator, or proctor, of the civilians and canonists. And he is one who is put in the place, stead, or turn of another, to manage his matters of law. Formerly every suitor was obliged to appear in person, to prosecute or defend his suit, (according to the old Gothic constitution), unless by special licence under the king's letters patent. This is still the law in criminal cases. And an idiot cannot to this day appear by attorney, but in person; for he hath not discretion to enable him to appoint a proper substitute: and upon his being brought before the court in so defenceless a condition, the judges are bound to take care of his interests, and they shall admit the best plea in his behalf that any one present can suggest. But as, in the Roman law, "*cum olim in usu fuisset, alterius nomine agi non posse, sed, quia hoc non minimam*

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incommoditatem habebat, ceperunt homines per procuratores litigare;" so, with us, on the same principle of convenience, it is now permitted in general, by divers ancient statutes, whereof the first is statute West. 2. c. 10. that attorneys may be made to prosecute or defend any action in the absence of the parties to the suit. These attorneys are now formed into a regular corps; they are admitted to the execution of their office by the superior courts of Westminster-hall; and are in all points officers of the respective courts in which they are admitted: and as they have many privileges on account of their attendance there, so they are peculiarly subject to the censure and animadversion of the judges. No man can practise as an attorney in any of those courts, but such as is admitted and sworn an attorney of that particular court: an attorney of the court of king's bench cannot practise in the court of common pleas; nor *vice versa*. To practise in the court of chancery, it is also necessary to be admitted a solicitor therein: and by the statute 22 Geo. II. c. 46. no person shall act as an attorney at the court of quarter-sessions, but such as has been regularly admitted in some superior court of record. So early as the statute 4 Hen. IV. c. 18. it was enacted, that attorneys should be examined by the judges, and none admitted but such as were virtuous, learned, and sworn to do their duty: And many subsequent statutes have laid them under farther regulations.

ATTORNEY General, is a great officer under the king, made by letters patent. It is his place to exhibit informations, and prosecute for the crown, in matters criminal; and to file bills in the exchequer, for any thing concerning the king in inheritance or profits; and others may bring bills against the king's attorney. His proper place in court, upon any special matters of a criminal nature, wherein his attendance is required, is under the judges on the left hand of the clerk of the crown: but this is only upon solemn and extraordinary occasions; for usually he does not sit there, but within the bar in the face of the court.

ATTOURNMENT, or ATTORNMENT, in law, a transfer from one lord to another of the homage and service a tenant makes; or that acknowledgment of duty to a new lord.

ATTRACTION, in natural philosophy, a general term used to denote the cause by which bodies tend towards each other, and cohere till separated by some other power. Hence there are four different species of attraction mentioned by philosophers, *viz.* of COHESION, ELECTRICITY, MAGNETISM, and GRAVITATION. See those articles.

Concerning the cause of attraction there have been many disputes; the most general opinion at present is, that it is a property originally impressed upon all kinds of matter by the Creator himself, and consequently that it has no natural cause. But others ridicule this account of the matter; affirming, that as the tendency of the different parts of matter towards one another is merely a natural phenomenon, we ought to seek for a natural cause of that phenomenon, it being equally unphilosophical to resolve attraction into a quality of matter, as to solve the phenomena of thunder, whirlwinds, hurricanes, &c. by saying they are qualities of the air.

Des Cartes accounted for attraction by his *materia subtilis*;
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Attraction.

Attraction *subtilis*; but as he was at so little pains to accommodate his system to the phenomena of nature, it very soon fell into disrepute, and even the existence of any kind of matter more subtle than the common air we breathe has been positively denied. This was running to the opposite extreme, and such an hypothesis was no less obviously false than that of Des Cartes. Hence Sir Isaac Newton himself was obliged to have recourse to the very same hypothesis with Des Cartes, and to suppose that there might be in nature a very subtle and invisible kind of fluid which he called *Ether**, that pervaded the whole creation, and was the cause of the different kinds of attraction we observe.

* See *Ether*.

This supposition of Sir Isaac's hath subjected him to no little censure from inferior geniuses; who without his abilities, or attention to the phenomena of nature, have determined that his admitting the existence of an ethereal fluid was only out of complaisance to the age he lived in. But he himself says no such thing, nor by his manner of expressing himself does he give us any room to think that this supposition proceeded from any thing else than a contemplation of nature: besides, the complying in this manner with an opinion known to be erroneous, would be unworthy of any philosopher, much more of Sir Isaac Newton. But experience has now made it manifest, that there is a kind of matter much more subtle than the common air, and which possesses every quality that Sir Isaac could wish for in his ether. The fluid we mean is that of electricity. Indeed, notwithstanding the different species of attraction abovementioned, it is far from being improbable, that, sometime or other, they may be all solved from the action of the electric fluid: certain it is, that no known substance seems so well calculated for being a general cause of attraction as this fluid, whether we consider its omnipresence as surrounding and pervading the whole earth and atmosphere, or the greatness of its power in overcoming every obstacle; and such powers are now allowed by philosophers in general to the electric fluid, that it appears hardly possible to avoid either curtailing those already assigned to it, or allowing it a larger if not an universal sphere of action*.

* See *Atmosphere*, *Electricity*, &c.

Electric Attractions. See *CHEMISTRY*, n° 15, 27, 64.

ATTRIBUTE, in a general sense, that which agrees with some person or thing; or a quality determining something to be after a certain manner. Thus understanding is an attribute of mind, and extension an attribute of body. That attribute which the mind conceives as the foundation of all the rest, is called its *essential attribute*: thus extension is by force, and solidity by others, esteemed the essential attributes of body or matter.

ATTRIBUTES, in theology, the several qualities or perfections of the Divine nature.

ATTRIBUTES, in logic, are the predicates of any subject, or what may be affirmed or denied of any thing.

ATTRIBUTES, in painting and sculpture, are symbols added to several figures, to intimate their particular office and character. Thus the eagle is an attribute of Jupiter; a peacock, of Juno; a caduceus, of Mercury; a club, of Hercules; and a palm, of Victory.

ATTRITION, the rubbing or striking of bodies one against another, so as to throw off some of their

superficial particles.

ATURE, an ancient town in the district of Novempopulana in Aquitania, on the river Aturus; now Aire in Gascony, on the Adour. E. Long. o. 3. N. Lat. 43. 40.

AVA, a kingdom Asia, in the peninsula beyond the Ganges. The king is very powerful, his dominions being bounded by Mogulistan on the west, Siam on the south, Tonquin and Cochinchina on the east, and by Tibet and China on the north. Several large rivers run through this country, which annually overflow their banks like the Nile, and thus render it extremely fertile. Here are mines of lead and copper, together with some of gold and silver, besides large quantities of the finest oriental rubies, sapphires, emeralds, &c.

AVA, the metropolis of the kingdom of the same name, is situated in E. Long. 96. 30. N. Lat. 21. o. It is pretty large; the houses built with timber or bamboo canes, with thatched roofs, and floors made of teak plank or split bamboo. The streets are very straight, with rows of trees planted on each side. The king's palace is an exact quadrangle, each side of which is 800 paces, and is surrounded with a brick wall; but the palace itself is of stone. It has four gates; the golden gate, through which all ambassadors enter; the gate of justice, through which the people bring petitions, accusations, or complaints; the gate of grace, through which those pass who have received any favours, or have been acquitted of crimes laid to their charge; and the gate of state, through which his majesty himself passes when he shews himself to the people.

AVADOUTAS, a sect of Indian bramins, who in austerity surpass all the rest. The other sects retain earthen vessels for holding their provisions, and a stick to lean on; but none of these are used by the Avadoutas: they only cover their nakedness with a piece of cloth; and some of them lay even that aside, and go stark naked, besmearing their bodies with cow-dung. When hungry, some go into houses, and without speaking, hold out their hand; eating on the spot whatever is given them. Others retire to the sides of holy rivers, and there expect the peasants to bring them provisions, which they generally do very liberally.

AVAIL OF MARRIAGE, in Scots law, that casualty in ward-holdings, by which the superior was intitled to a certain sum from his vassal, upon his attaining the age of puberty, as the value or avail of his tocher.

AVALON, a small but ancient city of Burgundy in France, about 500 paces long, and 300 broad. E. Long. 3. 5. N. Lat. 47. 38.

AVANIA, in the Turkish legislature, a fine for crimes, and, on deaths, paid to the governor of the place. In the places wherein several nations live together under a Turkish governor, he takes this profitable method of punishing all crimes among the Christians, or Jews, unless it be the murder of a Turk.

AVARICUM, an ancient town of the Bituriges in Gallia Celtica, situated on the rivulet Avara, in a very fertile soil. (Cæsar). Now Bourges in Berry. E. Long. 2. 30. N. Lat. 47. 10.

AVAST, in the sea-language, a term requiring to stop, or to stay.

AVAUN.

Attraction
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Avail.

VAUNCHERS, among hunters, the second branches of a deer's horns.

AUBAGNE, a town of Provence in France, situated on the river Veauve, on the road from Marseilles to Toulon. The flats sometimes hold their sessions at this place. E. Long. 5. 52. N. Lat. 43. 17.

AUBANE, in the customs of France, a right vested in the king of being heir to a foreigner that dies within his dominions.

By this right the French king claims the inheritance of all foreigners that die within his dominions, notwithstanding of any testament the deceased could make. An ambassador is not subject to the right of aubane; and the Swifs, Savoyards, Scots, and Portuguese, are also exempted, being deemed natives and regnicoles.

AUBENAS, a town of Languedoc in France, situated on the river Ardesche, at the foot of the mountains called the *Cevennes*. E. Long. 4. 32. N. Lat. 44. 40.

AUBENTON, a town of Picardy in France, situated on the river Aube. E. Long. 4. 25. N. Lat. 49. 51.

AUBETERRE, a town of France in the Angoumois, on the river Dronne. E. Long. 0. 10. N. Lat. 45. 15.

AUBIGNE, a town of Berry in France, situated on the river Verre, in a flat agreeable country. It is surrounded with high strong walls, wide ditches, and high countercarps. The castle is within the town, and is very handsome. E. Long. 2. 20. N. Lat. 47. 29.

AUBIN DU COMIER, a town of Brittany in France. W. Long. 1. 15. N. Lat. 48. 15.

AUBIN, in horsemanship, a broken kind of gait, between an amble and a gallop, accounted a defect.

AUBONNE, a town of Switzerland, in the canton of Beru. E. Long. 5. 54. N. Lat. 48. 30. It is situated near a river of the same name, seven miles north of the lake of Geneva, upon an eminence which has a gentle declivity, at the foot of which runs the river with an impetuous torrent. The town is built in the form of an amphitheatre; on the upper part of which stands a very handsome castle with a fine court, and a portico supported by pillars of a single stone each; above there is a covered gallery that runs round the court; and as the castle stands high, there is a most delightful prospect, not only of the town and neighbouring fields, but of the whole lake of Geneva and the land that surrounds it. At Thonen, in Savoy on the other side of the lake, is a tower covered with tin, which makes a glittering appearance when the sun is in a certain position; and the castle of Aubonne has likewise a tower of the same kind, which at certain hours makes a similar appearance to the Savoyards. The balliage of Aubonne contains several villages, which are mostly at the foot of the mountain Jura. In one part of this mountain there is a very deep cave, wherein those that go down find a natural and perpetual ice-house. At the bottom is heard a great noise like that of a subterraneous river, which is supposed to be that of the river Aubonne, because it first appears, with several sources, about 100 paces from the foot of that mountain.

AUBREY, (John), a famous English antiquary, descended from an ancient family in Wiltshire, was born in 1626. He made the history and antiquities of England his peculiar study and delight; and con-

tributed considerable assistance to the famous *Monasticon Anglicanum*. He succeeded to several good estates; but law-suits and other misfortunes consumed them all, so that he was reduced to absolute want. In this extremity he found a valuable benefactress in the lady Long of Draycot in Wilts, who gave him an apartment in her house, and supported him to his death, which happened about the year 1700. He was a man of capacity, learning, and application, a good Latin poet, an excellent naturalist, but somewhat credulous, and tainted with superstition. He left many works behind him. He wrote, 1. *Miscellanies*. 2. *A Perambulation of the county of Surry*, in five volumes, octavo. 3. *The Life of Mr Hobbes of Malmesbury*. 4. *Monumenta Britannica*, or a Discourse concerning Stonehenge, and Roll-Rich stones in Oxfordshire. 5. *Archæologica Sacra*; and several other works still in manuscript.

AUBURN, a market-town in Wiltshire in England. W. Long. 1. 20. N. Lat. 53. 20.

AUBUSSON, a small town of France, in the province of La Marche, and the government of the Lyonnais. Its situation is very irregular, on the river Creuse, in a bottom surrounded with rocks and mountains. A manufacture of tapestry is carried on here, by which the town is rendered very populous. E. Long. 2. 15. N. Lat. 45. 58.

AUCAUGREL, the capital of the kingdom of Adel in Africa, seated on a mountain. E. Long. 44. 25. N. Lat. 9. 10.

AUCH, a city of France, the capital of the county of Armagnac, and the metropolis of all Gascony. The archbishop assumes the title of primate of Aquitaine, and the cathedral is one of the finest in all France. The city stands on the declivity of a mountain near the river Gors. E. Long. 0. 40. N. Lat. 43. 40.

AUCTION, a kind of public sale, very much in use for household goods, books, plate, &c. By this method of sale the highest bidder is always the buyer. This was originally a kind of sale among the ancient Romans, performed by the public crier *sub hasta*, i. e. under a spear stuck up on that occasion, and by some magistrate, who made good the sale by delivery of the goods.

AUDEUS, the chief of the Audeans, obtained the name of an heretic, and the punishment of banishment, for celebrating Easter in the manner of the Jews, and attributing an human form to the Deity. He died in the country of the Goths, about the year 370.

AUDEANISM, the same with anthropomorphism. See **ANTHROPOMORPHITES**.

AUDIENCE given to ambassadors, a ceremony observed in courts at the admission of ambassadors or public ministers to a hearing.

In England, audience is given to ambassadors in the presence-chamber; to envoys and residents, in a gallery, closet, or in any place where the king happens to be. Upon being admitted, as is the custom of all courts, they make three bows; after which they cover and sit down; but not before the king is covered and sat down, and has given them the sign to put on their hats. When the king does not care to have them covered, and sit, he himself stands uncovered; which is taken as a slight. At Constantinople, ministers usually

Auburn
Audience.

Audience have audience of the prime vizier.

AUDIENCE is also the name of a court of justice established in the West-Indies by the Spaniards, answering in effect to the parliament in France. These courts take in several provinces, called also *audiences* from the names of the tribunal to which they belong.

AUDIENCE is also the name of an ecclesiastical court held by the archbishop of Canterbury, wherein differences upon elections, consecrations, institutions, marriages, &c. are heard.

AUDIENDO & TERMINANDO, a writ, or rather a commission to certain persons, when any insurrection or great riot is committed in any place, for the appeasing and punishment thereof.

AUDIENTES, or **AUDITORES**, in church-history, an order of catechumens; consisting of those newly instructed in the mysteries of the Christian religion, and not yet admitted to baptism.

AUDIT, a regular hearing and examination of an account by some proper officers, appointed for that purpose.

AUDITOR, in a general sense, a hearer, or one who listens and attends to any thing.

AUDITOR, according to our law, is an officer of the king, or some other great person, who, by examining yearly the accounts of the under-officers, makes up a general book, with the difference between their receipts and charges, and their allowances to allocations.

AUDITOR of the Receipts, is an officer of the exchequer who files the tellers bills, makes an entry of them, and gives the lord-treasurer a certificate of the money received the week before. He also makes debentures to every teller, before they receive any money, and takes their accounts. He keeps the black book of receipts, and the treasurer's key of the treasury, and sees every teller's money locked up in the new treasury.

AUDITORS of the Revenue, or of the exchequer, officers who take the accounts of those who collect the revenues and taxes raised by parliament, and take the accounts of the sheriffs, escheators, collectors, tenants, and customers, and set them down in a book, and perfect them.

AUDITORS of the Prest and Imprest, are officers of the exchequer, who take and make up the accounts of Ireland, Berwick, the mint, and of any money imposed by any man for the king's service.

AUDITORS Collegiate, Conventual, &c. officers formerly appointed in colleges, &c. to examine and pass their accounts.

AUDITORES. See **AUDIENTES**.

AUDITORIUM, in the ancient churches, was that part of the church where the audientes stood to hear and be instructed.

The auditorium was that part now called *navis ecclesiæ*. †. In the primitive times, the church was so strict in keeping the people together in that place, that the person who went from thence in sermon-time was ordered by the council of Carthage to be excommunicated.

AUDITORY, something relating to the sense of hearing.

AUDITORY, or **AUDIENCE**, an assembly of people who attend to hear a person that speaks in public.

AUDITORY is also used for the bench whereon a ma-

gistrate or judge hears causes.

AUDITORY, in ancient churches. See **AUDITORIUM**.

AUDITORY Passage, (*meatus auditorius*), in anatomy; the entrance of the ear *.

AUDITORY nerves. See **ANATOMY**, n° 400, b.

AVEIRO, a considerable city of Portugal, seated near the head of a small gulf formed by the tide at the mouth of the river Vouga. This river forms a small haven with a bar, over which vessels may pass that do not draw above eight or nine feet water. The city stands in a long plain, well watered, and very fertile. This plain is nine miles broad, from Porto to Coimbra; and is bounded on the east by a chain of mountains called *Sara d'Alcoba*, which reach from the one town to the other. Near this city there is salt made in sufficient quantity to serve two or three provinces. Here is a remarkable nunnery, where none are received but the daughters of the ancient nobility. The inhabitants of Aveiro have the singular privilege, that no stranger whatever can pass a night there without leave of the magistrate. W. Long. 9. 8. N. Lat. 40. 30.

AVELLANE, in heraldry, a cross, the quarters of which somewhat resemble a filbert-nut. Sylvanus Morgan says, that it is the cross which ensigns the mound of authority, or the sovereign's globe.

AVELLINO, a city of Italy, in the kingdom of Naples, with a bishop's see. It was almost ruined by an earthquake in 1694. E. Long. 15. 13. N. Lat. 40. 53.

AVE-MARIA, the angel Gabriel's salutation of the Virgin Mary, when he brought her the tidings of the incarnation.—It is become a prayer or form of devotion in the Romish church. Their chaplets and rosaries are divided into so many ave-marias, and so many pater-nosters, to which the Papists ascribe a wonderful efficacy.

AVENA, **OATS**, a genus of the digynia order, belonging to the triandria class of plants. Of this genus Linnæus enumerates 16 species, of which none deserve notice, except that which is commonly known and cultivated for grain; for a particular account of the culture of which, see **AGRICULTURE**, n° 116, 117.—Oats are an article of the *Materia Medica*. Gruels made from them have a kind of soft mucilaginous quality; by which they obtund acrimonious humours, and prove useful in inflammatory diseases, coughs, hoarseness, and exulcerations of the fauces.

AVENACEOUS, something belonging to or partaking of the nature of oats.

AVENAGE, in law, a certain quantity of oats paid by a tenant to a landlord, instead of rent or some other duties.

AVENCHE, an ancient city of Switzerland, in the canton of Bern, formerly the capital of all Switzerland, but now shews its former greatness only by its ruins. E. Long. 7. 7. N. Lat. 46. 50.

AVENES, a small but strong town in French Flanders, in the county of Hainaut, seated on the river Thèspes. It contains about 2500 inhabitants; but the houses are wretchedly built, and the streets irregular. It was fortified by M. Vauban in a strong regular manner. About this place are a prodigious number of white stones proper for building, and used by sculptors for statues: they are known by the name of *Stones of Avenes*.

Auditory
Audens.

* See *Anatomy*,
n° 405.

† See *Navis ecclesiæ*.

Avensis. E. Long. 3. 40. N. Lat. 50. 10.

AVENIO, an ancient town of the Cavares, and one of the most opulent in Gallia Narbonensis; now *Avignon*, in Provence. See *AVIGNON*.

AVENOR, an officer belonging to the king's stables, who provides oats for the horfes. He acts by warrant from the master of the horse.

AVENS, in botany. See *CARIOPHILLUS*.

AVENTINE (John), author of the *Annals of Bavaria*, was born of mean parentage, in the year 1466, at Abensperg in the country just named. He studied first at Ingolstadt, and afterwards in the university of Paris. In 1503, he privately taught eloquence and poetry at Vienna; and in 1507, he publicly taught Greek at Cracow in Poland. In 1509, he read lectures on some of Cicero's pieces at Ingolstadt; and in 1512, was appointed to be preceptor to prince Lewis and prince Ernest, sons of Albert the Wise, duke of Bavaria; and travelled with the latter of those two princes. After this he undertook to write the *Annals of Bavaria*, being encouraged by the dukes of that name, who settled a pension upon him, and gave him hopes that they would defray the charges of the book. This work, which gained its author great reputation, was first published in 1554, by Jerome Zieglerus, professor of poetry in the university of Ingolstadt; and afterwards at Basil in 1580, by Nicholas Cifer. An affront which Aventine received in the year 1529, stuck by him all the rest of his life: he was forcibly taken out of his sister's house at Abensperg, and hurried to a jail; the true cause of which violence was never known: but it would probably have been carried to a much greater length, had not the Duke of Bavaria interposed, and taken this learned man into his protection. Mr Bayle remarks, that the incurable melancholy which from this time possessed Aventine, was so far from determining him to lead a life of celibacy, as he had done till he was 64, that it induced him perhaps to think of marrying. The violence of his new passion was not however too great, but that it suffered him to advise with two of his friends, and consult certain passages of the Bible relative to marriage. The result was, that it was best for him to marry; and having already lost too much time, considering his age, he took the first woman he met with, who happened to be his own maid, ill-tempered, ugly, and extremely poor. He died the 9th of January, 1534, aged 68; leaving one daughter, who was then but two months old. He had a son, who died before.

AVENTINUS mons, one of the seven hills on which ancient Rome stood. The origin of the name *Aventinus*, is uncertain: but this hill was also called *Murcius*, from Murcia the goddess of sloth, who had a little chapel there; and *Collis Diane*, from the temple of Diana; likewise *Remonius*, from Remus who wanted to build the city and who was buried there. It was taken within the compass of the city by Ancus Marcius. To the east it had the city walls; to the south, the Campus Figulinus; to the west, the Tiber; and to the north, Mons Palatinus, in circuit two miles and a quarter.

AVENTURE, in law-books, means a mischance causing the death of a person without felony.

AVENUE, in gardening, a walk planted on each side with trees, and leading to an house, garden-gate, wood, &c. and generally terminated by some distant object.

All avenues that lead to a house ought to be at least as wide as the whole front of the house, if wider they are better still; and avenues to woods and prospects ought not to be less than 60 feet wide. The trees should not be planted nearer to one another than 35 feet, especially if they are trees of a spreading kind; and the same ought to be the distance, if they are for a regular grove.

The trees most proper for avenues with us, are the English elm, the lime, the horse-chestnut, the common chestnut, the beech, and the abele. The English elm will do in all grounds, except such as are very wet and shallow; and this is preferred to all other trees, because it will bear cuttings, heading, or lopping in any manner, better than most others. The rough or smooth Dutch elm is approved by some, because of its smooth growth; this is a tree which will bear removing very well, it is also green almost as soon as any plant whatever in spring, and continues so as long as any, and it makes an incomparable hedge, and is preferable to all other trees for lofty espaliers. The lime is valued for its natural growth, and fine shade. The horse chestnut is proper for all places that are not too much exposed to rough winds. The common chestnut will do very well in a good soil; and rises to a considerable height, when planted somewhat close; though, when it stands single, it is rather inclined to spread than to grow tall. The beech is a beautiful tree, and naturally grows well with us in its wild state; but it is less to be chosen for avenues than the before-mentioned, because it does not bear transplanting well, but is very subject to miscarry. Lastly, the abele is fit for any soil, and is the quickest grower of any forest-tree. It seldom fails in transplanting; and succeeds very well in wet soils, in which the others are apt to fail. The oak is but little used for avenues, because of its slow growth.

The old method of planting avenues was with regular rows of trees, and this has been always kept to till of late: but we have now a much more magnificent way of planting avenues; this is by setting the trees in clumps, or platoons, making the opening much wider than before, and placing the clumps of trees at about 300 feet distant from one another. In each of these clumps there should be planted either seven or nine trees; but it is to be observed, that this is only to be practised where the avenue is to be of some considerable length, for in short walks this will not appear so lightly as single rows of trees. The avenues made by clumps are fittest of all for parks. The trees in each clump should be planted about 30 feet asunder; and a trench should be thrown up round the whole clump, to prevent the deer from coming to the trees to bark them.

AVENZOAR, ABU MERWAN ABDALMALEC BEN ZOHAR, an eminent Arabian physician, flourished about the end of the eleventh or the beginning of the twelfth century. He was of noble descent, and born at Sevil, the capital of Andalusia, where he exercised his profession with great reputation. His grandfather and father were both physicians. The large estate he inherited from his ancestors, set him above practising altogether for gain: he therefore took no fees from the poor, or from artificers, though he refused not the presents of princes and great men. His liberality was extended even to his enemies; for which reason

Avenue,
Avenzoar.

Avenzoar,
Average.

reason he used to say, that they hated him not for any fault of his, but rather out of envy. Dr Freind writes, that he lived to the age of 135; that he began to practice at 40, or (as others say) at 20; and had the advantage of a longer experience than almost any one ever had, for he enjoyed perfect health to his last hour. He left a son, known also by the name of *Ebn Zohr*, who followed his father's profession, was in great favour with Al Manzur emperor of Morocco, and wrote several treatises of physic.

Avenzoar was cotemporary with Averroes, who, according to Leo Africanus, heard the lectures of the former, and learned physic of him; this seems the more probable, because Averroes more than once gives Avenzoar a very high and deserved encomium, calling him *admirable, glorious, the treasure of all knowledge, and the most supreme in physic from the time of Galen to his own*. Avenzoar, notwithstanding, is by the generality of writers reckoned an empiric: But Dr Freind observes, that this character suits him less than any of the rest of the Arabians. "He was bred," continues that author, "in a physical family, his father and grandfather being both practitioners, whom he always remembers with great gratitude and honour. "We have his own testimony that he had a regular education; and that he not only learned what properly belongs to a physician, but, out of a great desire of knowledge, every thing besides which relates to pharmacy or surgery." Dr Freind afterwards observes, "that he was averse to quackery, and rejects the idle superstitions of astrologers; and throughout all his work professes himself so much of the dogmatical or rational sect, which was directly opposite to the empirical, that he has a great deal of reasoning about the causes and symptoms of distempers; and as in his theory he chiefly, if not only, follows Galen, so he quotes him upon all occasions, oftener than the rest of the Arabians do. Notwithstanding he is so Galenical, there are several particulars in him which seldom or never occur in other authors; and there are some cases which he relates from his own experience, which are worth perusing." He wrote a book intitled, *Tayassir fi'l-maddawat wa'l-adbâr*, i. e. "The method of preparing medicines and diet" which is much esteemed. This work was translated into Hebrew, in the year of Christ 1280, and thence into Latin by Paravicinus, whose version has had several editions. The author added a supplement to it, under the title of *Jamé, or a Collection*. He also wrote a treatise *Fi'l-adwiyat wa'l-ghadiyahat*, i. e. "Of Medicines and Food;" wherein he treats of their qualities.

AVERAGE, in commerce, signifies the accidents and misfortunes which happen to ships and their cargoes, from the time of their loading and sailing, to their return and unloading; and is divided into three kinds. 1. The simple or particular average, which consists in the extraordinary expences incurred for the ship alone, or for the merchandizes alone. Such is the loss of anchors, masts, and rigging, occasioned by the common accidents at sea; the damages which happen to merchants by storm, prize, shipwreck, wet, or rotting; all which must be borne and paid by the thing which suffered the damage. 2. The large and common average, being those expences incurred, and damages

sustained, for the common good and security both of the merchandizes and vessels, consequently to be borne by the ship and cargo, and to be regulated upon the whole. Of this number are the goods or money given for the ransom of the ship and cargo, things thrown overboard for the safety of the ship, the expences of unloading for entering into a river or harbour, and the provisions and hire of the sailors when the ship is put under an embargo. 3. The small averages, which are the expences for towing and piloting the ship out of or into harbours, creeks, or rivers, one third of which must be charged to the ship, and two thirds to the cargo.

AVERAGE is more particularly used for a certain contribution that merchants make proportionably to their losses, who have had their goods cast into the sea in the time of a tempest. It also signifies a small duty which those merchants, who send goods in another man's ship, pay to the master for his care of them over and above the freight. Hence it is expressed in the bills of lading, paying so much freight for the said goods, with primage and average accustomed.

AVERDUPUIS. See AVOIRDUPUIS.

AVERNUS, a lake of Campania in Italy, near Baiz, famous among the ancients for its poisonous qualities. The following is the description given of it by Strabo. "Next to Baiz lies the Lucrine bay, and within it the lake Avernus. It was here that Homer had described Ulysses as conversing with Tiresias's ghost; for here they said was the oracle sacred to the shades, which Ulysses came and consulted concerning his return. The Avernus is a deep darksome lake, with a narrow entry from the outer bay: it is surrounded with steep banks that hang threatening over it; and is only accessible by the narrow passage thro' which you fall in. These banks were anciently quite overgrown with a wild wood, impenetrable to the human foot. Its gloomy shade impressed an awful superstition upon the minds of the beholders; whence it was reputed the habitation of the Cimmerians who dwelt in perpetual night. Whoever failed thither, first did sacrifice; and endeavoured to propitiate the infernal powers, with the assistance of some priests who attended upon the place, and directed the mystic performance. Within, a fountain of pure water broke out just over the sea; but nobody ever believed it, stating it to be a vein of the river Styx: somewhere near this fountain was the oracle; and the hot waters frequent in those parts made them think they were branches of the burning Phlegethon." The communication with the Lucrine lake is still to be distinguished, altho' filled up with earth; the distance between the two is but a few paces. The poisonous effluvia from this lake were said to be so strong, that they proved fatal to birds endeavouring to fly over it; but after grubbing up the wood, and building round it, no noxious effects were felt. Virgil ascribes the poisonous exhalation not to the lake itself, but to the cavern near it, which was called *Avernus, or Cave of the Sibyl*, and through which the poets feigned a descent to hell. Hence the proper name of the lake is *Lacus Avernus*, the lake near the cavern, as it is called by some ancient authors. It is now called *Averno*; is about two miles long, and one broad; and so far is it now from having any qualities noxious to birds, that many swim upon it. A little to the west

Average
Avernus

is the cave of the sibyl; but its noxious qualities seem also to be lost. There are also some old walls standing, which some suppose to have been a temple of Apollo, and others of Pluto. Among the ancients all the places which emitted poisonous exhalations were called *Avorni*.

AVERRHOA, in botany, a genus of the decandria order, belonging to the pentagynia class of plants. Of this genus there are three species, all natives of India, but possessing no remarkable quality.

AVERROES, one of the most subtle philosophers that ever appeared among the Arabians, flourished at the end of the 11th and beginning of the 12th century. He was the son of the high-priest and chief judge of Corduba in Spain: he was educated in the university of Morocco; and studied natural philosophy, medicine, mathematics, law, and divinity. After the death of his father, he enjoyed his posts; but, notwithstanding his being exceeding rich, his liberality to men of letters in necessity, whether they were his friends or his enemies, made him always in debt. He was afterwards stripped of all his posts, and thrown into prison, for heresy; but the oppressions of the judge who succeeded him, caused him to be restored to his former employments.

He died at Morocco in the year 1206. He was excessively fat, though he eat but once a-day. He spent all his nights in the study of philosophy; and when he was fatigued, amused himself with reading poetry or history. He was never seen to play at any game, or to partake in any diversion. He was extremely fond of Aristotle's works, and wrote commentaries on them; whence he was styled *The commentator*, by way of eminence. He likewise wrote a work on the whole art of physic, and many amorous verses; but when he grew old, he threw these last into the fire. His other poems are lost, except a small piece, in which he says, "that when he was young, he acted against his reason; but that, when he was in years, he followed its dictates:" upon which he utters this wish; "Would to God I had been born old, and that in my youth I had been in a state of perfection!" As to religion, his opinions were, that Christianity is absurd; Judaism, the religion of children; Mahometanism, the religion of swine.

AVERROISTS, a sect of peripatetic philosophers, who appeared in Italy some time before the restoration of learning, and attacked the immortality of the soul. They took their denomination from Averroes, the celebrated interpreter of Aristotle *, from whom they borrowed their distinguishing doctrine.

The Averroists, who held the soul was mortal, according to reason or philosophy, yet pretended to submit to the Christian theology, which declares it immortal. But the distinction was held suspicious; and this divorce of faith from reason was rejected by the doctors of that time, and condemned by the last council of the Lateran under Leo X.

AVERRUNCI (DEI); certain gods, whose business it was, according to the Pagan theology, to avert misfortunes. Apollo and Hercules were of the number of these gods, among the Greeks; and Castor and Pollux, among the Romans.

AVERSA, a town of Italy in the kingdom of Naples, with a bishop's see. It is situated in a very fine plain, in E. Long. 14. 20. N. Lat. 41. 0.

AVERSION, according to Lord Kaimes, is opposed

to *affection* *, and not to *desire*, as it commonly is. We have an affection to one person; we have an aversion to another: the former disposes us to do good to its object, the latter to do ill.

AVES, one of the Caribbee islands, 451 miles south of Porto Rico, with a good harbour for careening of ships. It is so called from the great number of birds that frequent it. There is another of the same name lying to the northward of this, in N. Lat. 15. 0.; and a third near the eastern coast of Newfoundland, in N. Lat. 50. 5.

AVES, the name of Linnæus's second class of animals. See Zoology, n° 8.

AVESBURY, (Robert), an English historian, of whom little more is known, than that he was keeper of the registry of the court of Canterbury in the reign of Edward III. and consequently that he lived in the 14th century. He wrote, *Memorabilia gestis magnifici regis Angliæ domini Edwardi tertii post conquestum, procerumque; tactis primitus quibusdam gestis de tempore patris sui domini Edwardi secundi, quæ in regni Angliæ, Scotiæ, et Franciæ, ac in Aquitania et Britannia, non humana sed Dei potentia, contigerunt, per Robertum de Avesbury*. This history ends with the battle of Poitiers, about the year 1356. It continued in manuscript till the year 1720, when it was printed by the industrious Thomas Hearne at Oxford, from a manuscript belonging to Sir Thomas Seabright. It is now become very scarce.

AUGE, a territory of Normandy in France, which gives title to a viscount. It extends from Falaise and Argenton as far as the sea, between the rivers Dives, Vie, and Touques. The arable land is stiff, and produces but little good corn: but they sow sainfoin; which succeeds so well that they have five good crops successively: they likewise sow flax and hemp; and have a vast quantity of apples, with which they made cyder. Horses are bred here in great numbers; and the inhabitants fatten the oxen which come from Poitou and Brittany.

AUGEAS, in fabulous history, was king of Elis, and particularly famed for his stable, which contained 3000 oxen, and had not been cleaned for 30 years. Hercules was desired to clear away the filth from this stable in one day; and Augeas promised, if he performed it, to give him a tenth part of the cattle. This task Hercules is said to have performed by turning the course of the river Alpheus through the stable; when Augeas refusing to stand by his engagement, Hercules slew him with his arrows, and gave his kingdom to Phyleus his son, who had shewn an abhorrence of his father's infincerity.

AUGMENT, in grammar, an accident of certain tenses of Greek verbs, being either the prefixing of a syllable, or an increase of the quantity of the initial vowels.

AUGMENTATION, in a general sense, is the act of adding or joining something to another with a design to render it large.

AUGMENTATION is also used for the additament or thing added.

AUGMENTATION was also the name of a court erected 27 Hen. VIII. so called from the augmentation of the revenues of the crown, by the suppression of religious houses; and the office still remains, wherein there are many

Aves
|
Augment-
tion.
* See A-
ffection.

Augment-
ation

Augsburgh.

many curious records, tho' the court has been dissolved long since.

AUGMENTATION, in heraldry, are additional charges to a coat-armour, frequently given as particular marks of honour, and generally borne either in the escutcheon or a conton; as have all the baronets of England, who have borne the arms of the Province of Ulster in Ireland.

AUGRE, or AWGRE, an instrument used by carpenters and joiners to bore large round holes; and consisting of a wooden handle, and an iron blade terminated at bottom with a steel bit.

AUGSBURG, a city of Germany, capital of the circle of Suabia, seated near the confluence of the Ardech and Lech, in one of the most beautiful plains that can be imagined. It is one of the largest and handfomest cities of the empire; but the fortifications are after the old manner, and very irregular; the streets are broad and straight; the houses mostly of timber, plastered and whitened without, or adorned with paintings; the rest are of free-stone; the churches and fountains are generally ornamented with fine figures of brads. Many of the churches are stately, and adorned within with curious workmanship and paintings. That part of the city erected by the noble family of the Fuggers, who are lords of the adjacent country, consists of several streets cross-wise, containing 106 houses: the poor people that inhabit them are maintained by an annual pension. Its magnificent town-house is little inferior to that of Amsterdam, it being a vast square stone-building, with a marble portico; at the top of the front, within the pediment, is a large spread eagle, holding a sceptre and globe in its talons, of brads gilt, said to weigh 2200 weight; the great portal is of a very beautiful reddish marble, over which is a balcony of the same colour, supported by two pillars of white marble; over the gate there are two large griffins of brads; most of the rooms are wainscotted and ceiled with very fine timber: the great hall is very magnificent, and paved with marble; it is 110 feet long, 58 broad, and 52 high, and its roof is supported by eight columns of red marble; the ceiling of the upper wall is of very curious workmanship of polished ash, consisting of compartments, the squares and pannels of which are enriched with gilded sculptures, and filled with pictures and other ornaments; this is likewise supported by eight pillars with bases and chapters of brads: the other rooms are handfomely adorned with very fine paintings.

In the square, near the town-house, is the fountain of Augustus, which is a marble basin, surrounded with iron balustrades finely wrought: at the four corners are four brads statues as big as the life, two of which are women and two men; in the middle of the basin is a pedestal, at the foot of which are four large sphinxes spouting water out of their breasts; a little above these are four infants holding four dolphins in their arms, which pour water out of their mouths; and over these infants are fetlocks and pine-apples all of brads; upon the pedestal is the statue of Augustus as large as the life. The fountain most remarkable next to this is that of Hercules, which is a hexagon basin with several brads figures, particularly Hercules engaging the hydra. Another curiosity is the secret gate, which was contrived to let in persons safely in time of war: it has 50

many engines and divisions with gates and keys, and apartments for guards at some distance from each other, where passengers are examined, that it is impossible for the town to be surpris'd this way; the gates are bolted and unbolted, opened and shut, by unseen operators, insomuch that it looks like enchantment. The water-towers are also very curious, of which there are three seated on a branch of the river Lech, which runs thro' the city in such a torrent as to drive many mills, which work a number of pumps that raise the water in large leaden pipes to the top of the towers; one of these sends water to the public fountains, and the rest to near 1000 houses in the city.

The Lutherans have a college here, which is a vast square building, with a fine clock on the top of the front. In this there are seven different classes, a hall for public disputations, and a theatre for dramatic representations. The cathedral is a large, gloomy, Gothic building, with two spire-steeple; it is adorned with paintings upon whimsical subjects, and has a great gate all of brads, over which are several scripture passages well represented in basso relievo. The Jesuits have a splendid college here, which, with their church, is full of gilding, painting, and carving; they have likewise a fine library. Though half the inhabitants are Lutherans, there are a great many Popish processions. There are no Jews in the town, nor are they suffered to lie there; but they inhabit a village at about a league distance, and pay so much an hour for the liberty of trading in the day-time. The Benedictine abbey is a vast Gothic building, the ceiling of which is said to be the highest in Germany, and overlooks all the rest of the churches; it is adorned with several statues, and has one very grand altar. The church of St Croix is one of the handfomest in Augsburgh for architecture, painting, sculpture, gilding, and a fine spire.

The inhabitants look upon Augustus Cæsar as the founder of the town: it is true, that that emperor sent a colony there; but the town was already founded, though he gave it the name of *Augusta Vindelicorum*. But that which will eternise the memory of this town is the confession of faith which the Protestant princes presented to Charles V. in 1530. Though the Protestants were very powerful at Augsburgh, they could not keep their ground; for the Bavarians drove them from thence: but Gustavus Adolphus restored them again in 1632; since which time they have continued there, and share the government with the Papists. In 1703, the elector of Bavaria took the city after a siege of seven days, and demolished the fortifications: however, the battle of Hochstedt restored their liberty, which they yet enjoy under the government of their own magistrates, the bishop having no temporal dominion in the city. The chapter is composed of persons of quality, who are to bring proofs of their nobility. The canons have a right of electing their own bishop, who is a sovereign, in the same manner as several other of the German bishops. E. Long. 10. 58. N. Lat. 48. 24.

AUGUR, an officer among the Romans appointed to foretell future events, by the chattering, flight, and feeding, of birds. There was a college or community of them, consisting originally of three members with respect to the three Luceres, Rhamneses, and Tatien-fes: afterwards the number was increased to nine, four

Augst
Augst

Augural
Aurgy.

of whom were patricians, and five plebeians. They bore an augural staff or wand, as the ensign of their authority; and their dignity was so much respected, that they were never deposed, nor any substituted in their place, tho' they should be convicted of the most enormous crimes. See *AUGURY*.

AUGURAL, something relating to the augurs.—The augural instruments are represented on several ancient medals.

AUGURAL Supper, that given by a priest on his first admission into the order, called also by Varro *Adjuvialis*.

AUGURAL Book, those wherein the discipline and rules of augury were laid down.

AUGURALE, the place in a camp where the general took auspicia. This answered to the *Auguratorium* in the city.

AUGURALE is also used in Seneca, for the ensign or badge of an augur, as the *lituus*.

AUGURATORIUM, a building on the Palatine mount, where public auguries were taken.

AUGURY, in its proper sense, the art of foretelling future events by observations taken from the chattering, singing, feeding, and flight, of birds; though it is used by some writers in a more general signification, as comprising all the different kinds of divination*.

Augury was a very ancient superstition. We know from Hesiod, that husbandry was in part regulated by the coming or going of birds; and most probably it had been in use long before his time, as astronomy was then in its infancy. In process of time, these animals seem to have gained a greater and very wonderful authority, till at last no affair of consequence, either of private or public concern, was undertaken without consulting them. They were looked upon as the interpreters of the gods; and those who were qualified to understand their oracles were held among the chief men in the Greek and Roman states, and became the assessors of kings, and even of Jupiter himself. However absurd such an institution as a college of Augurs may appear in our eyes, yet, like all other extravagant institutions, it had in part its origin from nature. When men considered the wonderful migration of birds, how they disappeared at once, and appeared again at stated times, and could give no guess where they went, it was almost natural to suppose, that they retired somewhere out of the sphere of this earth, and perhaps approached the ethereal regions, where they might converse with the gods, and thence be enabled to predict events. It was almost natural for a superstitious people to imagine this; at least to believe it, as soon as some impolish was impudent enough to assert it. Add to this, that the disposition in some birds to imitate the human voice must contribute much to the confirmation of such a doctrine. This institution of augury seems to have been much more ancient than that of aruspicy; for we find many instances of the former in Homer, but not a single one of the latter, though frequent mention is made of sacrifices in that author. From the whole of what has been observed, it seems probable that natural augury gave rise to religious augury, and this to aruspicy, as the mind of man makes a very easy transition from a little truth to a great deal of error.

A passage in Aristophanes gave the hint for these observations.

In the comedy of the Birds, he makes one of them say thus: 'The greatest blessings which can happen to you, mortals, are derived from us; first, we shew you the seasons, viz. Spring, Winter, Autumn. The crane points out the time for sowing, when she flies with her warning notes into Egypt; she bids the sailor hang up his rudder and take his rest, and every prudent man provide himself with winter-garments. Next the kite appearing, proclaims another season, viz. when it is time to shear his sheep. After that the swallow informs you when it is time to put on summer clothes. We are to you, (adds the chorus), Ammon, Dodona, Apollo: for, after consulting us, you undertake every thing; merchandise, purchases, marriages, &c.' Now, it seems not improbable, that the same transition was made in the speculations of men, which appears in the poet's words; and that they were easily induced to think, that the surprising foresight of birds, as to the time of migration, indicated something of a divine nature in them; which opinion Virgil, as an Epicurean, thinks fit to enter his protest against, when he says,

*Haud equidem credo, quia sit divinitus illis
Ingenium.*

But to return to Aristophanes. The first part of the chorus, from whence the afore-cited passage is taken, seems, with all its wildness, to contain the fabulous cant, which the augurs made use of in order to account for their impudent impositions on mankind. It sets out with a cosmogony; and says, That in the beginning were Chaos and Night, and Erebus and Tartarus: That there was neither water, nor air, nor sky: That Night laid an egg, from whence, after a time, Love arose: That Love, in conjunction with Erebus, produced a third kind; and that they were the first of the immortal race, &c.

AUGUST, in chronology, the eighth month of our year, containing 31 days. August was dedicated to the honour of Augustus Cæsar, because, in the same month, he was created consul, thrice triumphed in Rome, subdued Egypt to the Roman empire, and made an end of civil wars; being before called *Sexatilis*, or the sixth from March.

AUGUSTA, or *AUSTA*, an island in the Adriatic sea, on the coast of Dalmatia, near Regusa, subject to Venice. E. Long. 17. 50. N. Lat. 42. 35.

AUGUSTA Ausiorum, a town of Aquitania, so named out of compliment to Augustus, being originally called *Climberrum*, which name it afterwards refused. In the middle age, it took the name of the people, *Aufesi*; and is now called *Auch*, the capital of Gascony*. * See *Auch*.

AUGUSTA Emerita, a town of Lusitania on the river Anas, the capital of the province; a colony of the Emeriti, or such soldiers as had served out their legal time, were men of experience, or had received marks of favour. The colony was founded by Augustus; and is now called *Merida*, a city of Spain, in Estremadura, on the river Guadiana. See *MERIDAN*.

AUGUSTA Pretoria, a town and colony of Gallia Cisalpina, and capital of the Salaffi; seated at the foot of the Alps Graia on the Duria. Now *Ausstein* in Piedmont. See *AOUSTE*.

AUGUSTA Rauracorum, a town of Gallia Belgica: now a small village called *August*, at the bend of the Rhine northwards, but from the ruins, which are still

August
Augusta.

Augusta
Augustin.

to be seen, appears to have been a considerable colony, at the distance of six miles from Basil to the east.

AUGUSTA *Suessonum*, a town of Gallia Belgica on the Axona; so called from Augustus, and with great probability supposed to be the Noviodunum *Suessonum* of Cæsar. Now *Soissons*, on the river Aisne, in the Isle of France. See SOISSONS.

AUGUSTA *Taurinorum*, a town of the Taurini at the foot of the Alps where the Duria Minor falls into the Po; now *Turin*, the capital of Piedmont *.

* See *Turin*.

AUGUSTA *Treba*, a town of the *Æqui*, near the springs of the river Anio in Italy; now *Trevi*, in Umbria, or in the east of the Campagna di Roma †.

† See *Trevi*.

AUGUSTA *Trevirorum*, a town of the Treviri, a people inhabiting between the Rhine and the Meuse, but especially about the Moselle; now *Triers*, or *Treves*, in the circle of the Lower Rhine on the Moselle ‡.

‡ See *Treves*.

AUGUSTA *Vindelicorum*, a town of the Licates on the Licus; called by Tacitus a noble colony of *Rætia*; now *Augsburg*, capital of Suabia *.

* See *Augsburg*.

AUGUSTALES, in Roman antiquity, an epithet given to the flames or priests appointed to sacrifice to Augustus after his dedication; and also to the ludi or games celebrated in honour of the same prince on the fourth of the ides of October.

AUGUSTALIA, a festival instituted by the Romans in honour of Augustus Cæsar, on his return to Rome, after having settled peace in Sicily, Greece, Syria, Asia, and Parthia; on which occasion they likewise built an altar to him, inscribed *Fortuna reduci*.

AUGUSTALIS PRÆFECTUS, a title peculiar to a Roman magistrate who governed Egypt, with a power much like that of a proconsul in other provinces.

AUGUSTIN, or AUSTIN, (St), the first archbishop of Canterbury, was originally a monk in the convent of St Andrew at Rome, and educated under St Gregory, afterwards pope Gregory I. by whom he was dispatched into Britain with 40 other monks of the same order, about the year 596, to convert the English Saxons to Christianity. They landed in the isle of Thanet; and having sent some French interpreters to king Ethelbert with an account of their errand, the king gave them leave to convert as many of his subjects as they could, and assigned their place of residence at Dorovernum, since called *Canterbury*; to which they were confined till the king himself was converted, whose example had a powerful influence in promoting the conversion of his subjects; but though he was extremely pleased at their becoming Christians, he never attempted to compel them. He dispatched a priest and a monk to Rome, to acquaint the pope with the success of his mission, and to desire his resolution of certain questions. These men brought back with them a pall, and several books, vestments, utensils, and ornaments for the churches. His holiness, by the same messengers, gave Augustin directions concerning the settling of episcopal sees in Britain; and ordered him not to pull down the idol-temples, but to convert them into Christian churches; only destroying the idols, and sprinkling the place with holy water; that the natives, by frequenting the temples they had been always accustomed to, might be the less shocked at their entrance into Christianity. Augustin resided principally at Canterbury, which thus became the metropolitan church of England; and having established bishops in several

Augustin.

of the cities, he died on the 26th of May, 607. The Popish writers ascribe several miracles to him. The observation of the festival of St Augustin was first joined in a synod held under Cuthbert archbishop of Canterbury, and afterwards by the pope's bull in the reign of king Edward III.

AUGUSTINE (St), an illustrious father of the church, was born at Thagaste, a city of Numidia, on the 13th of November, 354. His father, a burgher of that city, was called *Patricius*; and his mother, *Monica*, who being a woman of great virtue, instructed him in the principles of the Christian religion. In his early youth he was in the rank of the catechumens; and falling dangerously ill, earnestly desired to be baptized; but the violence of the distemper ceasing, his baptism was delayed. His father, who was not yet baptized, made him study at Thagaste, Madaura, and afterwards at Carthage. Augustine, having read Cicero's books of philosophy, began to entertain a love for wisdom, and applied himself to the study of the holy scriptures; nevertheless, he suffered himself to be seduced by the Manicheans. At the age of 19, he returned to Thagaste, and taught grammar, and also frequented the bar: he afterwards taught rhetoric at Carthage with applause. The insolence of the scholars at Carthage made him take a resolution to go to Rome, tho' against his mother's will. Here also he had many scholars; but disliking them, he quitted Rome, and settled at Milan, and was chosen public professor of rhetoric in that city. Here he had opportunities of hearing the sermons of St Ambrose, which, together with the study of St Paul's epistles, and the conversion of two of his friends, determined him to retract his errors, and quit the sect of the Manicheans: this was in the 32^d year of his age. In the vacation of the year 386, he retired to the house of a friend of his, named *Verecundus*, where he seriously applied himself to the study of the Christian religion, in order to prepare himself for baptism, which he received at Easter, in the year 387. Soon after this, his mother came to see him at Milan, and invite him back to Carthage; but at Ostia, whither he went to embark in order to his return, he died. He arrived in Africa about the end of the year 388; and having obtained a garden-plot without the walls of the city of Hippo, he associated himself with 11 other persons of eminent sanctity, who distinguished themselves by wearing leathern girdles, and lived there in a monastic way for the space of three years, exercising themselves in fasting, prayer, study, and meditation, day and night: from hence sprung up the Augustine friars, or eremites of St Augustine, being the first order of mendicants; those of St Jerome, the Carmelites, and others, being but branches of this of St Augustine. About this time, or before, Valerius bishop of Hippo, against his will, ordained him priest: nevertheless, he continued to reside in his little monastery, with his brethren, who, renouncing all property, possessed their goods in common. Valerius, who had appointed St Augustine to preach in his place, allowed him to do it in his presence, contrary to the custom of the churches in Africa. He explained the creed, in a general council of Africa, held in 393. Two years after, Valerius, fearing he might be preferred to be bishop of another church, appointed him his coadjutor or colleague, and caused him to be ordained

Augustine dained bishop of Hippo, by Megalus bishop of Calame, then primate of Numidia. St Augustine died the 28th day of August, 430, aged 76 years, having had the misfortune to see his country invaded by the Vandals, and the city where he was bishop besieged for seven months.

The works of St Augustine make ten tomes; the best edition of them is that of Maurin, printed at Antwerp, in 1700. They are but little read at this time, except by the clergy of the Greek church and in the Spanish universities. The bookellers of London receive frequent commissions for them, and indeed for the most of the fathers, from Russia, and also from Spain.

AUGUSTINE (St), a fort of North America, on the east coast of Cape Florida, situated in W. Long. 81. 10. N. Lat. 30. 0. This fort was built by the Spaniards; who were scarce well established there, when they were attacked by Sir Francis Drake in 1586, who reduced and pillaged the fort and town adjacent. In 1665, it underwent a similar fate, being attacked by Captain Davis at the head of a considerable company of bucaners. In 1702, an attempt was made by Colonel More to annex St Augustine to the British dominions. He invested it with only 500 English and 700 Indians; which small force, however, would have been sufficient to reduce the place, had not succours arrived when it was on the point of surrendering. Even then, it is thought that he might have defeated the reinforcement which arrived; but he chose to raise the siege, and retire with precipitation. In 1740, another unsuccessful attempt was made on this fort by general Oglethorpe: it was, however, together with the whole country of Florida, ceded to Great Britain by the treaty of Paris in 1763.

AUGUSTINE, a cape of South America. W. Long. 35. 4. S. Lat. 8. 30.

AUGUSTINES, a religious order in the church of Rome, who follow the rule of St Augustine, prescribed them by pope Alexander IV. Among other things, this rule enjoins to have all things in common, to receive nothing without the leave of their superior; and several other precepts relating to charity, modesty, and chastity. There are likewise nuns of this order. The Augustines are clothed in black, and at Paris are known under the name of the *religious of St Genevieve*, that abbey being the chief of the order.

AUGUSTOBONA, a city of the Tricassiers in ancient Gaul, from whom it was afterwards called *Tricasses*, and *Trecassa*; and still farther corrupted to *Traces*, or *Treci*; whence the modern name *Troyes*, in Champagne on the Seyne. See *TROYES*.

AUGUSTODUNUM, the capital of the *Ædui*, where there was a famous academy or school for the education of youth; now Aulun, or *Aulun*, in the duchy of Burgundy, on the Arroux. See *AULUN*.

AUGUSTOMAGUS, an ancient town of Gallia Belgica; now *Sentis*, in the Isle of France. E. Long. 2. 30. N. Lat. 49. 10.

AUGUSTOW, a small but strong town of Poland, in the duchy and palatinate of Polakia, seated on the river Nariue. E. Long. 24. 2. N. Lat. 53. 25.

AUGUSTUS (Fort), a small fortress seated on a plain at the head of Lochness in Scotland, between the rivers Taarf and Oich; the last is a considerable

stream, and has over it a stone bridge of three arches. The fort consists of four bastions; within is the governor's house, and barracks for 400 men: it was taken by the rebels in 1746, who immediately deserted it, after demolishing what they could. The name of this fort in Erse is *Kill-chuimin*, or the burial place of the Cummins. It lies on the road to the Isle of Sky, which is about 52 miles off; but on the whole way there is not a place fit for the reception of man or horse.

AUGUSTUS (Caius Julius Cæsar Octavianus), the nephew of Julius Cæsar, was born at Rome 63 years before Jesus Christ. When he understood that his uncle had adopted him for his heir, he went to Italy and attached himself to his party. He quarrelled with M. Antonius; but afterward entering into a treaty with him and Lepidus, these three formed the second triumvirate, agreed to a proscription of their respective enemies, and divided the empire among them. Lepidus being abandoned by his army, was sent into exile; and Antonius being reduced to destroy himself, Octavius assumed the title of Emperor, and the appellation of *Augustus*. He was cruel in his triumvirate, but seemed to have adopted new virtues with his imperial dignity; since he now appeared just, affable, moderate, and liberal: he maintained peace; advanced men of merit; and patronised arts and sciences, which under his reign were brought to the greatest perfection. He died at the age of 75. See *ROME*.

AVIARY, a place set apart for feeding and propagating birds. It should be so large, as to give the birds some freedom of flight; and tutred, to avoid the appearance of foulness on the floor.

AVICENA, or **AVICENNES**, the prince of Arabian philosophers and physicians, was born at Afena, a village in the neighbourhood of Bokhara. His father was from Balkh in Persia, and had married at Bokhara. The first years of Avicennes were devoted to the study of the Koran, and the Belles Lettres. He soon shewed what he was likely to become afterwards; and the progress he made was so rapid, that, when he was but ten years old, he was perfectly intelligent in the most hidden senses of the Koran.

About-Abdoulah, a native of Napoulous in Syria, at that time professed philosophy at Bokhara with the greatest reputation. Avicennes studied under him the principles of logic; but, soon disgusted with the slow manner of the schools, he set about studying alone, and read all the authors that had written on philosophy, without any other help than that of their commentators. Mathematics had no fewer charms for him; and, after reading the first six propositions of Euclid, he got alone to the last, having made himself perfect master of them, and treasured up all of them equally in his memory.

Possessed with an extreme avidity to be acquainted with all sorts of sciences, he likewise devoted himself to the study of medicine. Persuaded that this divine art consists as much in practice as in theory, he sought all opportunities of seeing the sick; and afterwards confessed, that he had learned more from experience than from all the books he had read. He was now in his 16th year, and already was celebrated for being the light of his age. He resolved at this age to resume his studies of philosophy, which medicine had made

Augustus
|
Avicena.

him neglect; and he spent a year and a half in this painful labour, without ever sleeping all this time a whole night together. If he felt himself oppressed by sleep, or exhausted by study, a glass of wine refreshed his wasted spirits, and gave him new vigour for study; if in spite of him his eyes for a few minutes shut out the light, it then happened to him to recollect and meditate upon all the things that had occupied his thoughts before sleep. At the age of 21, he conceived the bold design of incorporating, in one work, all the objects of human knowledge; and carried it into execution in an *Encyclopædie* of 20 volumes, to which he gave the title of the "Utility of Utilities."

Several great princes had been taken dangerously ill, and Avicennes was the only one that could know their ailments and cure them. His reputation increased daily, and all the kings of Asia desired to retain him in their families.

Mahmud, the son of Sabektékín, the first sultan of the Dynasty of the Samanides, was then the most powerful prince of the east. Imagining that an implicit obedience should be paid by all manner of persons to the injunctions of his will, he wrote a haughty letter to Mamun sultan of Kharazm, ordering him to send Avicennes to him, who was at his court, with several other learned men. Philosophy, the friend of liberty and independence, looks down with scorn on the shackles of compulsion and restraint. Avicennes, accustomed to the most flattering distinctions among the great, could not endure the imperious manner of Mahmud's inviting him to his court, and refused to go there. But the Sultan of Kharazm, who dreaded his resentment, obliged the philosopher to depart with others whom that prince had demanded to be sent to him.

Avicennes pretended to obey; but, instead of repairing to Gazna, he took the rout of Georgian. Mahmud, who had gloried in the thoughts of keeping him at his palace, was greatly irritated at his flight. He dispatched portraits done in crayons of this philosopher to all the princes of Asia, with orders to have him conducted to Gazna, if he appeared in their courts. But Avicennes had fortunately escaped the most diligent search after him. He arrived in the capital of Georgian, where, under a disguised name; he performed many admirable cures.

Cabous then reigned in that country. A nephew, whom he was extremely fond of, being fallen sick, the most able physicians were called in, and none of them were able to know his ailment, or give him any ease. Avicennes was at last consulted. So soon as he had felt the young prince's pulse, he was confident with himself, that his illness proceeded from a violent love, which he dared not to declare. Avicennes commanded the person, who had the care of the different apartments in the palace, to name them all in their respective order. A more lively motion in the prince's pulse, at hearing mentioned one of these apartments, betrayed a part of his secret. The keeper then had orders to name all the slaves that inhabited that apartment. At the name of one of these beauties, the young Cabous could not contain himself; an extraordinary beating of his pulse completed the discovery of what he in vain desired to keep concealed. Avicennes, now fully assured that this slave was the cause of this prince's illness, declared that she alone had the power to cure him.

The Sultan's consent was necessary, and he of course was curious to see his nephew's physician. He had scarce looked at him, when he knew in his features those of the crayoned portrait sent him by Mahmud; but Cabous, far from forcing Avicennes to repair to Gazna, retained him for some time with him, and heaped honours and presents on him.

This philosopher passed afterwards into the court of Nedjmeddevie, Sultan of the race of the Bouides. Being appointed first physician to that prince, he found means to gain his confidence to so great a degree, that he raised him to the post of Grand Visir. But he did not long enjoy that illustrious dignity. Too great an attachment for pleasures, especially those of love and the table, made him lose at the same time his post and his master's favour. From that time Avicennes felt all the rigours of adversity, which he had brought upon himself by his ill conduct. He wandered about as a fugitive, and was often obliged to shift the place of his habitation to secure his life from danger. He died at Hamadan, aged 58 years, in the 428th year of the Hegira, and of Christ 1036.

The perfect knowledge he had of physic did not secure him from the ailments that afflict human nature. He was attacked by several maladies in the course of his life, and particularly was very subject to the colic. His excesses in pleasures, and his infirmities, made a poet say, who wrote his epitaph, that the profound study of philosophy had not taught him good morals, nor that of medicine the art of preserving his own health.

No one composed with greater facility than Avicennes, writing, when he sat down to it, 50 pages generally in a day, without fatiguing himself. The doctors of Chiraz, having made a collection of objections against one of his metaphysical works, sent it to him at Ispahan by Cafem. This learned man, not arriving till towards evening, came to Avicennes's house, with whom he sat discoursing till midnight. When Cafem was retired, he wrote an answer to the objections of the Chiraziens, and finished it before sun-rise. He immediately delivered it to Cafem, telling him, that he had made all possible dispatch in order not to detain him any longer at Ispahan.

Avicennes, after his death, enjoyed so great a reputation, that, till the 12th century, he was preferred for the study of philosophy and medicine to all his predecessors. His works were the only writings in vogue in schools, even in Europe. The following are the titles.

1. Of the Utility and Advantage of Sciences, XX books.
2. Of Innocence and Criminality, II books.
3. Of Health and Remedies, XVIII books.
4. On the means of preserving Health, III books.
5. Canons of Physic, XIV books.
6. On Astronomical Observations, I book.
7. On Mathematical Sciences.
8. Of Theorems, or Mathematical and Theological Demonstrations, I book.
9. On the Arabic Language, and its Proprieties, X books.
10. On the Last Judgment.
11. On the Origin of the Soul, and the Resurrection of Bodies.
12. Of the end we should propose to ourselves in Harangues and Philosophical Arguments.
13. Demonstration of the collateral Lines in the Sphere.
14. Abridgment of Euclid.
15. On Finité and Infinity.
16. On Physics and Metaphysics.
17. On Animals and Vegetables,

bles, &c. 18. *Encyclopedie*, 20 volumes.—Some, however, charge him with having stolen what he published from a celebrated physician who had been his master. This man had acquired so much honour and wealth, that he was solicited by many to take their sons to be his scholars, or even his servants; but being resolved not to discover the secrets of his art, he would receive none of them. *Avicene's* mother formed the following stratagem: she offered him her son as a servant, pretending he was naturally deaf and dumb; and the youth, by his mother's instructions, counterfeited these defects so well, that the physician, after making several trials to discover the reality of them, took the boy into his service, and by degrees trusted him so far as to leave his writings open in his room when he went abroad: *Avicene* took that opportunity to transcribe them, and carried the copies to his mother; and after the death of his master he published them under his own name. Indeed if we reflect that he lived but 58 years, that he was a wanderer and a fugitive, and that he was much addicted to his pleasures, we shall have some difficulty to conceive how he could find time to compose so many works. *Physic*, however, is indebted to him for the discovery of cassia, rhubarb, mirabolans, tamarinds; and from him also, it is said, came to us the art of making fugar.

AVICENIA, in botany, a genus of the angiospermia order, belonging to the didynamia class of plants; of which there are two species, but possessed of no remarkable properties.

AVIGLIANO, a small town of Piedmont in Italy. *E. Long.* 7. 5. *N. Lat.* 44. 40.

AVIGNON, a city of Provence in France, the capital of the county of Venaissin, and seated on the banks of the Rhone. It is an archbishop's see, and the residence of several popes at this place for 70 years has rendered it considerable. Its walls are built with free stone, with several square towers, adorned with pinnacles. The ditches are not large, but are in proportion to the height of the walls, and are in some places full of water. This city belongs to the pope, who sends a vice-legat every three years, who in some sense is the governor. Near the Rhone there is a large rock, within the circumference of the walls, upon which is a platform, from whence may be had a prospect of the whole city and the places about it. This city is embellished with magnificent churches, a large square, beautiful buildings, and very agreeable gardens. The palace of the vice-legat is composed of several large square towers, and he gives audience in a great hall which is full of fine paintings, as is also the chapel and the apartments. The arsenal is near the palace.

The church of Notre Dame is ancient, but not large, and is one of the best adorned in the city. After having ascended about 50 steps, you come to a very ancient portico, which sustains a great tower; as you enter the church on the left hand, you see paintings which equal the finest in Italy. The great altar is very magnificent, and is adorned with a shrine that contains the relics of we know not how many saints. The treasure of the facility is worthy of the curiosity of the traveller. The little palace where the archbishop resides is formed of three bodies of lodgings, accompanied with courts and small pavilions. It overlooks the Rhone, the city, and the fields. These buildings and

the mint adorn a large square, which is the common walk of the inhabitants.

In *Avignon* they reckon seven gates, seven palaces, seven colleges, seven hospitals, seven monasteries, seven nunneries, and seven popes who have lived there in 70 years. The church of the Celestines is very magnificent, and full of fine monuments, and the rest are not without their curiosities. The university has four colleges; and the place where the Jews live is a distinct quarter, from whence the Jews who pay tribute dare not stir out without yellow hats, and the women must have something yellow about their heads, to distinguish them from the Christians. Their number is very considerable in a very confined place, where the only way of enlarging their abodes is by building their houses higher. Their synagogue is so dark, that they are obliged to light lamps. However, they are forced to hear a monk preach a sermon every week. There was a stone bridge over the Rhone, which is here very rapid; but the greatest part is carried away, and the vacancy supplied with wood. It had 20 arches, but it was narrow, though above a quarter of a mile long. The curious that travel this way go to see the fountain of Vaucluse, where the river Sorgues, which passes through this city, has its source. Below the bridge there is an island where the Sorgues joins the Rhone, in which are several houses of pleasure. *E. Long.* 4. 59. *N. Lat.* 43. 57.

AVILA, a city of Old Castile, in Spain, seated on an eminence on the banks of the river Adaja, and in sight of the mountains of Pico. It is fortified both by nature and art, having a wall 9075 feet in circumference, adorned with 26 lofty towers, and 10 handsome gates. There are 17 principal streets, the houses in which are generally good, and some of them stately. It hath nine squares, 2000 houses, nine parishes, as many monasteries, seven nunneries, two colleges, nine hospitals, 18 chapels, and an allowance of 10,000 ducats yearly for the maintenance of orphans and other poor people. It has an university, and a considerable bishopric; besides a noble cathedral, which has eight dignitaries, 20 canons, and the same number of minor canons. It stands in the middle of a fine large plain, surrounded with mountains, and covered with fruit-trees and vineyards. There is likewise a manufacture of cloth. *W. Long.* 4. 13. *N. Lat.* 40. 35.

AVIS, a small town of Alentijo in Portugal, seated on an eminence with a castle near the river Avis. Hence the military order of the knights of Avis have their name. *W. Long.* 7. 0. *N. Lat.* 38. 40.

AVISO, a term chiefly used in matters of commerce to denote an advertisement, an advice, or piece of intelligence.

AVISON, (Charles), organist of Newcastle, and a disciple of Geminiani, was the author of an essay on musical expression, published in the year 1752, in which are some judicious reflections on music in general, but his division of the modern authors into classes is rather fanciful than just. Throughout his book he celebrates Marcello and Geminiani; the latter frequently in prejudice to Mr Handel. In the year 1753 came out remarks on Mr Avison's essay on musical expression, the author whereof first points out sundry errors against the rules of composition in the works of Avison. In the same year Avison republished his essay, with a reply

Avignon

Avion.

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ply to the author of the remarks; and a letter, containing a number of loose particulars relating to music collected in a course of various reading, unquestionably written by Dr Jortin. Avison promoted and assisted in the publication of Marcello's music to the psalms adapted to English words. Of his own composition there are extant five collections of concertos for violins, 44 in number; and two sets of sonatas for the harpsichord and two violins, a species of composition little known in England till his time. The music of Avison is light and elegant, but it wants originality; a necessary consequence of his too close attachment to the style of Geminiani, which in a few particulars only he was able to imitate. *Hawkins's Hist. of Music.*

AUK, in ornithology. See ALCA.

AUKLAND, a town in the bishopric of Durham in England, situated on the river Wre. W. Long. o. 57. N. Lat. 54. 44.

AULA is used for a court baron, by Spelman; by some old ecclesiastical writers, for the nave of a church, and sometimes for a court-yard.

AULCESTER, a town of Warwickshire in England. W. Long. 1. 47. N. Lat. 52. 15.

AULETES, in antiquity, denotes a flute-player. One of the Ptolemies, kings of Egypt, father of Cleopatra, bore the surname or denomination of *Auletes*.

AULIC, an epithet given to certain officers of the empire, who compose a court which decides, without appeal, in all processes entered in it. Thus we say, *aulic council, aulic chamber, aulic counsellor.*

The aulic council is composed of a president, who is a catholic; of a vice-chancellor, presented by the archbishop of Mentz; and of 18 counsellors, nine of whom are protestants, and nine catholics. They are divided into a bench of lawyers, and always follow the emperor's court; for which reason they are called *justitiam imperatoris*, the emperor's justice, and aulic council. The aulic court ceases at the death of the emperor; whereas the imperial chamber of Spire is perpetual, representing not only the deceased emperor, but the whole Germanic body, which is reputed never to die.

AULIC, in the Sorbonne and foreign universities, is an act which a young divine maintains upon being admitted a doctor in divinity. It begins by an harangue of the chancellor, addressed to the young doctor, after which he receives the cap, and presides at the aulic, or disputation.

AULON, anciently a town and dock or station for ships in Illyricum, on the Adriatic; now *Valona*, or *Velana*, a port-town in the duchy of Ferrara on one of the mouths of the Po. See VALONA.

AULOS, a Grecian long measure, the same with stadiun.

AULPS, a town of Provence in France, in the diocese of Trejus, with the title of a Vigueria. E. Long. 6. 25. N. Lat. 43. 40.

AULUS GELLIUS. See GELLIUS.

AUMBRY, a country-word denoting a cup-board.

AUME, a Dutch measure for Rhenish wine, containing 40 English gallons.

AUNCCEL-WEIGHT; an ancient kind of balance now out of use, being prohibited by several statutes, on account of the many deceipts practised by it. It consisted of scales hanging on hooks, fastened at each end of a beam, which a man lifted up on his hand. In

many parts of England, auncel-weight signifies meat sold by the hand, without scales.

AUNE, a long measure used in France to measure cloths, stuffs, ribbons, &c. At Rouen, it is equal to one English ell; at Calais, to 1.52; at Lyons, to 1.061; and at Paris, to 0.95.

AUNGERVYLE (Richard), commonly known by the name of *Richard de Bury*, was born in 1281, at St Edmund's Bury, in Suffolk, and educated at the university of Oxford. After which he entered into the order of Benedictine monks, and became tutor to Edward prince of Wales, afterwards king Edward III. Upon the accession of his royal pupil to the throne he was appointed cofferer, then treasurer of the wardrobe, archdeacon of Northampton, prebendary of Lincoln, Sarum, and Litchfield, keeper of the privy seal, dean of Wells, and last of all was promoted to the bishoprick of Durham. He likewise enjoyed the offices of lord high chancellor, and treasurer of England; and discharged two important embassies at the court of France. Learned himself, and a patron of the learned, he maintained a correspondence with some of the greatest geniuses of the age, particularly with the celebrated Italian poet Petrarch. He was also of a most humane and benevolent temper, and performed many signal acts of charity. Every week he made eight quarters of wheat into bread, and gave it to the poor. Whenever he travelled between Durham and Newcastle, he distributed eight pounds sterling in alms; between Durham and Stockton five pounds, between Durham and Aukland five marks, and between Durham and Middleham five pounds. He founded a public library at Oxford, for the use of the students, which he furnished with the best collection of books then in England; and appointed five keepers, to whom he granted yearly salaries. At the dissolution of religious houses in the reign of Henry VIII. Durham college, where he fixed the library, being dissolved among the rest, some of the books were removed to the public library, some to Baliol college, and some came into the hands of Dr George Owen, a physician of Godstow, who bought that college of king Edward VI. Bishop Aungervyle died at his manor of Aukland, April 24. 1345, and was buried in the south part of the cross isle of the cathedral church of Durham, to which he had been a benefactor. He wrote, 1. *Philobiblon*, containing directions for the management of his library at Oxford, and a great deal in praise of learning, in bad Latin. 2. *Epistola familiarium*; some of which are written to the famous Petrarch. 3. *Orationes ad principes*; mentioned by Bale and Pitts.

AUNIS, the smallest province in France, bounded on the north by Poitou, on the west by the ocean, on the east and south by Saintogne, of which it was formerly a part. It is watered by the rivers Seure and Sarente, the former of which has its source at Seure in Poitou. The coast of this small district has the advantage of several ports, the most remarkable of which are Rochefort, Rochelle, Brouge, St Martin de Re, Tremblade, Tonnai, and Charente. The soil of this country is dry, yet produces good corn and plenty of wine. The marshes feed a great number of cattle, and the salt marshes yield the best salt in Europe.

AVOCATORIA, a mandate of the emperor of Germany, addressed to some prince, in order to stop

his

avoidance his unlawful proceedings in any cause appealed to him.

AVOIDANCE, in the canon law, is when a benefice becomes void of an incumbent; which happens either in fact, as by the death of the person; or in law, as by cession, deprivation, resignation, &c. In the first of these cases, the patron must take notice of the avoidance, at his peril; but in avoidance by law, the ordinary is obliged to give notice to the patron, in order to prevent a lapse.

AVOIRDUPOIS. This is the weight for the larger and coarser commodities, such as groceries, cheese, wool, lead, &c. Bakers, who live not in corporation towns, are to make their bread by avoirdupois-weight, those in corporations by troy-weight. Apothecaries buy by avoirdupois-weight, but sell by troy. The proportion of a pound avoirdupois to a pound troy is as 17 to 14.

AVOSETTA, in ornithology. See **RECURVIROSTRA**.

AVOWEE, one who has a right to present to a benefice. He is thus called in contradistinction to those who only have the lands to which the advowson belongs for a term of years, or by virtue of intrusion or disseisin.

AVOWRY, in law, is where a person distrained sues out a replevin; for then the distrainer must vow, and justify his plea, which is called his *avowry*.

AURA, among physiologists, an airy exhalation or vapour. The word is Latin, derived from the Greek, *αὔρα*, gentle wind.

AURACH, a town of Germany with a good castle, in the south part of Suabia, in the duchy of Wirtemberg. It is the usual residence of the youngest sons of the house of Wirtemberg, and is seated at the foot of a mountain on the rivulet Erms. E. Long. 9. 20. N. Lat. 48. 25.

AURANCHES, the capital of a territory called *Auranchin*, about 30 miles in length, in Lower Normandy in France. The air is mild and temperate, and the best cyder in Normandy is produced here.

The city stands on an hill, near which the river See runs, and is about a mile and a half from the ocean. W. Long. 1. 20. N. Lat. 48. 51.

AURANTIUM, in botany. See **CITRUS**.

AURAY, a small seaport town of Lower Brittany in France, situated in the gulph called *Morbihan*. It is nothing, properly speaking, but a large quay, and a handsome street, being chiefly known for its trade. W. Long. 2. 25. N. Lat. 47. 48.

AURELIA, in natural history, the same with what is more usually called *chrysalis*, and sometimes *nymph*.*

AURELIANUS (Lucius Domitius), emperor of Rome, was one of the greatest generals of antiquity, and commanded the armies of the emperor Claudius with such glory, that after the death of that emperor all the legions agreed to place him on the throne; this happened in the year 270. He carried the war from the east to the west, with as much facility, says a modern writer, as a body of troops marches from Alface into Flanders. He defeated the Goths, Sarmatians, Marcomanni, the Persians, Egyptians, and Vandals; conquered Zenobia queen of the Palmyrenians, and Tetricus general of the Gauls; both of whom were made to grace his triumph, in the year 274. He was killed by one of his generals in Thrace in the year

275, when he was preparing to enter Persia with a great army. See **ROME**.

AURELIUS VICTOR. See **VICTOR**.

AURENGABAD, a city in the East Indies, capital of the province of Balagate, in the dominions of the Great Mogul. It is furnished with handsome mosques and caravanseras. The buildings are chiefly of free-stone, and pretty high, and the streets planted on each side with trees. They have large gardens well stocked with fruit-trees and vines. The soil about it is also very fertile, and the sheep fed in its neighbourhood are remarkably large and strong. E. Long. 75. 30. N. Lat. 19. 10.

AURENG-ZEBE, the Great Mogul. See **INDOSTAN**.

AUREOLA, in its original signification, signifies a jewel, which is proposed as a reward of victory in some public dispute. Hence, the Roman schoolmen applied it to denote the reward bestowed on martyrs, virgins, and doctors, on account of their works of supererogation; and painters use it to signify the crown of glory, with which they adorn the heads of saints, confessors, &c.

AUREUS, a Roman gold coin, equal in value to 25 denarii.—According to Ainsworth, the aureus of the higher empire weighed near five penny-weights; and in the lower empire, little more than half that weight. We learn from Suetonius, that it was customary to give aurei to the victors in the chariot-races.

AURICK, a city of Germany, in East Friesland, in the circle of Westphalia; to which the king of Prussia claims a right. It is situated in a plain surrounded with forests full of game. E. Long. 6. 50. N. Lat. 53. 28.

AURICLE, in anatomy, that part of the ear which is prominent from the head, called by many authors *auris externa*.

AURICLES, are likewise two muscular bags situated at the basis of the heart, and intended as diverticula for the blood during the diastole.*

AURICULAR, whatever belongs or relates to the ear.

AURICULAR Tube, an instrument to facilitate hearing. See **ACOUSTICS**, n^o 2^d 26.

AURIGA, the *WAGGONER*, in astronomy, a constellation of the northern hemisphere, consisting of 23 stars, according to Tycho; 40, according to Hevelius; and 68, in the Britannic catalogue.

AURILLAC, a town of France in the Lower Auvergne, seated on a small river called *Jordane*. It is one of the most considerable towns of the province, has six gates, is very populous, and yet has but one parish. The castle is very high, and commands the town. The abbot is lord of Aurillac, and has episcopal jurisdiction; he is also chief justice of the town. This place is remarkable for having produced several great men. E. Long. 2. 33. N. Lat. 44. 55.

AURIPIGMENTUM, **ORPIMENT**, in natural history. See **ORPIMENT**.

AURISCALPIUM, an instrument to clean the ears, and serving also for other operations in disorders of that part.

AURORA, the morning twilight, or that faint light which appears in the morning when the sun is within 18 degrees of the horizon.

AURORA,

Aurelius

Aurora.

* See *Anatom.* m^o 3^o 5^o.

Aurora
Borealis.

AURORA, the goddess of the morning, according to the pagan mythology. She was the daughter of Hyperion and Theia, according to Hesiod; but of Titan and Terra, according to others. It was under this name that the ancients desired the light which foreruns the rising of the sun above our hemisphere. The poets represent her as rising out of the ocean, in a chariot, with rosy fingers dropping gentle dew. Virgil describes her ascending in a flame-coloured chariot with four horses.

AURORA BOREALIS, NORTHERN TWILIGHT, or *Streamers*; a kind of meteor appearing in the northern part of the heavens, mostly in the winter-time, and in frosty weather. It is now so generally known, that no description is requisite; and indeed the variety of its appearances is so great, as to render a particular description almost impossible.

1
This meteor
formerly
very rare.

The aurora borealis, though now so common, seems formerly to have been very rare; and indeed we can scarce avoid attributing to this meteor many of the prodigies that are mentioned by ancient historians, as the flame that appeared over the city of Constantinople, those before the siege of Jerusalem, &c. and its appearances being accounted ominous, shews that it hath in those ages been seen very seldom, in comparison to what it is now. This we are assured of by Dr Halley, who tells us, that when he saw a great aurora borealis in 1716, he had begun to despair of ever seeing one at all; none having appeared, at least in any considerable degree, from the time he was born till then. Notwithstanding this long interval, however, it seems that in some periods the aurora borealis had been seen much more frequently; and perhaps this, as well as other natural phenomena, may have some stated times of returning.

2
History by
Dr Halley.

The only thing that resembles a distinct history of this phenomenon, is what we have from the learned Dr Halley, Phil. Trans. n° 347. The first account he gives, is of the appearance of what is called by the author, *burning spears*, and was seen at London on January 30th, 1560. This account is taken from a book intitled *description of Meteors* by W. F. D. D. and reprinted at London in 1654. The next appearance, on the testimony of *Stow*, was on October 7th, 1564. In 1574 also, according to *Camden*, and *Stow* above-mentioned, an aurora borealis was observed two nights successively, viz. on the 14th and 15th of November, with much the same appearances as described by Dr Halley in 1716, and which we now so frequently observe. Again, the same was twice seen in Brabant, in the year 1575; viz. on the 13th of February, and 28th of September. Its appearances at both these times were described by Cornelius Gemma, professor of medicine in the university of Lovain, who seems to have been struck with the utmost horror at the sight; and compares them to spears, fortified cities, and armies fighting in the air. Concerning these four appearances, Dr Halley remarks that they all happened at the same age of the moon, viz. two days after the change. After this, Michael Mæstlin, tutor to the great Kepler, assures us, that at Baknang in the county of Wurtemberg in Germany, these phenomena, which he styles *chafnata*, were seen by himself no less than seven times in 1580. In 1581, they again appeared in an extraordinary manner in April and September, and in a less

degree at some other times of the same year. In 1621, September 24, this phenomenon was observed all over France, and described by Gassendus, who gave it the name of *aurora borealis*: yet neither this, nor any similar appearances posterior to 1574, are described by English writers, till the year 1707; which, as Dr Halley observes, shews the prodigious neglect of curious matters which at that time prevailed. From 1621 to 1707, indeed, there is no mention made of an aurora borealis being seen by any body; and considering the number of astronomers who during that period were in a manner continually poring on the heavens, we may very reasonably conclude that no such thing did make its appearance till after an interval of 86 years. In 1707, a small one was seen in November; and during that year and the next, the same appearances were repeated five times. The next on record, is that mentioned by Dr Halley in March 1716; since which time they have been so common, that no accounts have been kept of them.

It was for a long time a matter of doubt whether this meteor made its appearance only in the northern hemisphere, or whether it was also to be observed near the south pole. This is now ascertained by Mr Forster; who, in his late voyage round the world along with captain Cook, assures us, that he observed them in the high southern latitudes, though with phenomena somewhat different from those which are seen here. On Feb. 17, 1773, as they were in Lat. 58° south, "A beautiful phenomenon (says he) was observed during the preceding night, which appeared again this and several following nights. It consisted of long columns of a clear white light, shooting up from the horizon to the eastward, almost to the zenith, and gradually spreading on the whole southern part of the sky. These columns were sometimes bent sidewise at their upper extremities; and though in most respects similar to the northern lights (*aurora borealis*) of our hemisphere, yet differed from them in being always of a whitish colour, whereas ours assume various tints, especially those of a fiery and purple hue. The stars were sometimes hid by, and sometimes faintly to be seen through, the substance of these southern lights (*aurora australis*), which have hitherto, as far as I can find, escaped the notice of voyagers. The sky was generally clear when they appeared, and the air sharp and cold, the thermometer standing at the freezing point." On the 16th and 19th of March the same year, the aurora australis was again observed, and the last time rather brighter than before, and the columns formed an arch across the sky.

Dr Halley observed that the aurora borealis described by him arose to a prodigious height, it being seen from the west of Ireland to the confines of Russia and Poland on the east; nor did he know how much further it might have been visible: so that it extended at least 30 degrees in longitude; and, from lat. 50 north, it was seen over all the northern part of Europe; and what was very surprising, in all those places where it was visible, the same appearances were exhibited which Dr Halley observed at London. He observes, with seeming regret, that he could by no means determine its height, for want of observations made at different places; otherwise he might as easily have calculated the height of this aurora borealis, as he did of the fiery globe

Aurora
Borealis.

3
Mr Forster
account
similar
appearances
in the southern
hemisphere.

4
Rises very
high.

globe in 1719 *. To other philosophers, however, he gives the following exhortation. "When therefore for the future any such thing shall happen, all those that are curious in astronomical matters are hereby admonished and intreated to set their clocks to the apparent time at London, for example, by allowing for many minutes as is the difference of meridians; and then to note, at the end of every half hour precisely, the exact situation of what at that time appears remarkable in the sky; and particularly the azimuths of those very tall pyramids so eminent above the rest, and therefore likely to be seen forthwith: to the intent that, by comparing these observations taken at the same moment in distant places, the difference of their azimuths may serve to determine how far these pyramids are distant from us."—With this pathetic advice no two philosophers have yet thought proper to comply, notwithstanding the multitude of opportunities that have since occurred; a shameful instance of philosophic indolence! The only faint attempt towards ascertaining this matter we find in the *Philosoph. Transactions*, Vol. LXIV. where a correspondent in North America acquaints Dr Franklin then at London, that an aurora borealis had been seen in America, and asks whether on the same night there had been any such appearance at London. The Doctor replies, that there had indeed been an aurora borealis that night; and that, if it had likewise been seen in America, it must have been very high.

With regard to the cause of the aurora borealis, many conjectures have been formed. The first which naturally occurred, was, that it was occasioned by the ascent of inflammable sulphureous vapours from the earth, which taking fire in the rarer regions of the atmosphere, exhibited, by its flaming in different directions, the beautiful appearances we often observe in the aurora borealis. To this supposition Dr Halley objects the immense extent of such phenomena, and that they are constantly observed to proceed from north to south, but never from south to north. This made him very reasonably conclude, that there was some connection between the poles of the earth and the aurora borealis. The Doctor was in a great measure unacquainted with the electric power, though he well knew that of magnetism: he supposed therefore, that this earth was hollow, having within it a magnetical sphere, which corresponded in virtue with all the natural and artificial magnets on the surface; the poles of the central magnet not corresponding exactly with those of the outer shell of earth, he thought might be the reason why the magnetic needle did not always point due north; and the magnetic effluvia passing through the earth, from one pole of the central magnet to another, might sometimes become visible, in their course, which he thought was from north to south, and thus exhibit the beautiful coruscations of the aurora borealis. This conjecture, for it could be no more, has commonly been looked upon as an extravagant flight of fancy; but if we consider the matter thoroughly, we shall find it an undoubted proof of a most profound and solid genius. Dr Halley, as already observed, was in a manner totally ignorant of the powers of electricity, and therefore was obliged to work with such materials as he had. Had he known that a stroke of electricity would give polarity to a needle that had it not, or reverse the poles of one that had it before, he would un-

doubtedly have concluded the electric and magnetic effluvia to be the same, and that the aurora borealis was this fluid performing its circulation from one pole of the earth to the other. In fact, this very hypothesis is adopted by S. Beccaria; and by the supposed circulation of the electric fluid he accounts for the phenomena of magnetism and the aurora borealis in a manner perfectly similar to that of Dr Halley, only changing the phrase *magnetic effluvia* for *electric fluid*. The following is the account given us by Dr Priestley, of Beccaria's sentiments on this matter.

"Since a sudden stroke of lightning gives polarity to magnets, he conjectures, that a regular and constant circulation of the whole mass of the fluid from north to south may be the original cause of magnetism in general. This is truly a great thought; and, if just, will introduce greater simplicity into our conceptions of the laws of nature.

"That this ethereal current is insensible to us is no proof of its non-existence, since we ourselves are involved in it. He had seen birds fly so near a thunder-cloud, as he was sure they would not have done had they been affected by its atmosphere.

"This current he would not suppose to arise from one source, but from several, in the northern hemisphere of the earth. The aberration of the common centre of all these currents from the north point may be the period of the variation, and the obliquity with which the currents strike into the earth may be the cause of the dipping, of the needle, and also why bars of iron more easily receive the magnetic virtue in one particular direction.

"He thinks that the aurora borealis may be this electric matter performing its circulation in such a state of the atmosphere as renders it visible, or approaching the earth nearer than usual. Accordingly very vivid appearances of this kind have been observed to occasion a fluctuation in the magnetic needle."

Here we must first remark, that, if this thought, as Dr Priestley says, is *truly great*, its greatness is justly due to Dr Halley: we cannot suppose S. Beccaria to have been ignorant of Dr Halley's magnetic hypothesis; and if he was not ignorant of it, it is impossible to avoid believing him to be tacitly obliged to it. On the thought itself, however, we must observe, that a circulation of an immense quantity of electric fluid round the earth bears a striking similitude to one of Des Cartes's vortices; and as such a circulation hath by no means been proved, this very circumstance ought to make us cautious of receiving it. But besides this, Mr Forster, in the passage above quoted, furnishes us with a direct disproof of this circulation; with which, though neither Dr Halley nor S. Beccaria could be acquainted, they might have thought of it as a final proof either of the truth or falsehood of their hypothesis.—If the aurora borealis is no other than the electric fluid performing the abovementioned circulation, it ought to dart from the horizon towards the zenith in the northern hemisphere, and from the zenith to the horizon in the southern one: but Mr Forster plainly tells us, that the columns shot up from the horizon towards the zenith as well in the southern hemisphere as in the northern; so that if the aurora borealis is to be reckoned the flashings of electric matter, its course is plainly directed from both poles towards the equator,

Aurora
Borealis.

and not from one pole to the other.

Concerning the cause of this phenomenon Mr Canton has the following query: "Is not the aurora borealis the flashing of electrical fire from positive towards negative clouds at a great distance, through the upper part of the atmosphere where the resistance is least?" But to this we must reply in the negative; for in this case it would flash in every direction according to the position of the clouds, as well as from north to south. Besides this query, he conjectures, that when the needle is disturbed by the aurora borealis, that phenomenon proceeds from the electricity of the heated air; and supposes the air to have the property of becoming electric by heat, like the tourmalin. But neither does this hypothesis appear at all probable; because, in such a case, the aurora borealis ought to be most frequent in summer when the air is most heated, whereas it is found to be the reverse.——Lastly, with these electrical hypotheses we shall contrast that of Mr Mairan, who imagined this phenomenon to proceed from the atmosphere of the sun, particles of which were thrown off by its centrifugal force acquired by his rotation on his axis; and that these particles falling upon the atmosphere of the earth near its equatorial parts, were from thence propelled by the diurnal motion of the earth towards the polar regions, where they formed the aurora borealis. This hypothesis, besides its being a mere supposition unsupported by one single appearance in nature, is liable to the objection already mentioned; for in this case the light should dart from the equator to the poles, and not from the poles to the equator: or if we should suppose this matter to be gradually accumulated at each of the poles, we must then make other suppositions, equally vague and ill founded, concerning its getting back with such surprising rapidity in direct opposition to the power which once brought it thither.

The first person that seems to have endeavoured to find any positive proof for the electrical quality of the aurora borealis, is Dr Hamilton of Dublin. He observes, that though this phenomenon is commonly supposed to be electrical, yet he had not seen any attempt to prove that it is so: but the only proof he himself brings is an experiment of Mr Hawkbee, by which the electric fluid is shown to put on appearances somewhat like the aurora borealis, when it passes through a vacuum. He observed, that when the air was most perfectly exhausted, the streams of electric matter were then quite white; but when a small quantity of air was let in, the light assumed more of a purple colour. The flashing of this light therefore from the dense regions of the atmosphere into such as are more rare, and the transitions through mediums of different density, he reckons the cause of the aurora borealis, and of the different colours it assumes.

Dr Hamilton's proof, then, of the electricity of the aurora borealis, consists entirely in the resemblance the two lights bear to one another; and if to this we add, that, during the time of an aurora borealis, the magnetic needle hath been disturbed, electric fire obtained from the atmosphere in plenty, and at some times different kinds of rumbling and hissing sounds heard, we have the sum of all the positive evidence in favour of the electric hypothesis.

Was the aurora borealis the first natural phenomenon the solution of which had been attempted by elec-

tricity, no doubt the proofs just now adduced would be very insufficient: but when it is considered, that we have indisputable evidence of the identity of the phenomena of thunder and of electricity; when we also consider, that the higher parts of our atmosphere are continually in a strongly electrified state; the analogy becomes so strong, that we can scarce doubt of the aurora borealis arising from the same cause. The only difficulty is, to give a good reason why the electricity of the atmosphere should be constantly found to direct its course from the poles towards the equator, and not from the equator to the poles; and this we think may be done in the following manner.

1. It is found that all electric bodies, when considerably heated, become conductors of electricity; thus hot air, hot glass, melted resin, sealing wax, &c. are all conductors, till their heat is dissipated, and then they again become electric.

Sec Elec-
tricity pas-
sim.

2. As the converse of every true proposition ought also to be true, it follows from the above one, that if electric when heated become conductors, then non-electrics when subjected to violent degrees of cold ought to become electric. In one instance this has been verified by experience: water, which is a conductor when warm or not violently cooled, is found to become electric when cooled to 20° below 0 of Fahrenheit's thermometer. With regard to metallic substances, indeed, no experiments have as yet been made to determine whether their conducting power is affected by cold or not. Very probably we might not be able to produce such a degree of cold as sensibly to lessen their conducting power; but still the analogy will hold; and, as we are by no means able to produce the greatest degree of cold possible, reason will always suggest to us, that if a certain degree of cold changes one conductor into an electric, a sufficient degree of it will also change all others into electric.

3. If cold is sufficient to change conducting substances into electric, it must also increase the electric power of such substances as are already electric; that is to say, very cold air, glass, resin, &c. provided they are dry, will be more electric than when they are warmer. With regard to air, which is most to our present purpose, this is rendered extremely probable, by considering that clear frosty weather is of all others the most favourable for electric experiments. They may be made indeed to equal advantage almost in any state of the atmosphere, provided sufficient pains is used, but in dry hard frosts they will succeed much more easily than at any other time.

These three axioms being allowed, the cause of the aurora borealis is easily deduced from them. The air, all round the globe, at a certain height above its surface, is found to be exceedingly cold, and, as far as experiments have yet determined, exceedingly electrical also. The inferior parts of the atmosphere between the tropics, are violently heated during the day-time by the reflection of the sun's rays from the earth. Such air will therefore be a kind of conductor, and much more readily part with its electricity to the clouds and vapours floating in it, than the colder air towards the north and south poles. Hence the prodigious appearances of electricity in these regions, shewing itself in thunder and other tempests of the most terrible kind. Immense quantities of the electric fluid are thus communicated.

Aurora
Borealis

nicated to the earth, and the inferior warm atmosphere having once exhausted itself must necessarily be recruited from the upper and colder region. This becomes very probable from what the French mathematicians observed when on the top of one of the Andes. They were often involved in clouds, which, sinking down into the warmer air, appeared there to be highly electrified, and discharged themselves in violent tempests of thunder and lightning; while in the mean time, on the top of the mountain, they enjoyed a calm and serene sky. In the temperate and frigid zones, the inferior parts of the atmosphere never being so strongly heated, do not part with their electricity so easily as in the torrid zone, and consequently do not require such recruits from the upper regions; but notwithstanding the difference of heat observed in different parts of the earth near the surface, it is very probable that at considerable heights the degree of cold is nearly equal all round it. Were there a like equality in the heat of the under part, there could never be any considerable loss of equilibrium in the electricity of the atmosphere: but as the hot air of the torrid zone is perpetually bringing down vast quantities of electric matter from the cold air that lies directly above it; and as the inferior parts of the atmosphere lying towards the north and south poles do not conduct in any great degree; it thence follows, that the upper parts of the atmosphere lying over the torrid zone will continually require a supply from the northern and southern regions. This easily shews the necessity of an electric current in the upper parts of the atmosphere from each pole towards the equator: and thus we are also furnished with a reason why the aurora borealis appears more frequently in winter than in summer; namely, because at that time the electric power of the inferior atmosphere is greater on account of the cold than in summer; and consequently the abundant electricity of the upper regions must go almost wholly off to the equatorial parts, it being impossible for it to get down to the earth: hence also the aurora borealis appears very frequent and bright in the frigid zones, the degree of cold in the upper and under regions of the atmosphere being much more nearly equal in these parts than in any other. In some parts of Siberia, particularly, this meteor appears constantly from October to Christmas, and its convulsions are said to be very terrifying. Travellers agree, that here the aurora borealis appears in greatest perfection; and it is to be remarked, that Siberia is the coldest country on earth. In confirmation of this, it may also be observed, that, from the experiments hitherto made with the electrical kite, the air appears considerably more electrical in winter than in summer, though the clouds are known to be often most violently electrified in the summer time; a proof, that the electricity naturally belonging to the air is in summer much more powerfully drawn off by the clouds than in the winter, owing to the excess of heat in summer, as already observed.

A considerable difficulty, however, still remains, from the upright position which the streams of the aurora borealis are generally observed to have; whereas, according to the hypothesis above mentioned, they ought rather to run directly from north to south. This difficulty occurred to Dr Halley: but he answers it by supposing his magnetic effluvia to pass from one pole to another in arches of great circles, arising to a vast

height above the earth, and consequently darting from the places whence they arose almost like the radii of a circle; in which case, being sent off in a direction nearly perpendicular to the surface of the earth, they must necessarily appear erect to those who see them from any part of the surface, as is demonstrated by mathematicians. It is also reasonable to think that they will take this direction rather than any other, on account of their meeting with less resistance in the very high regions of the air than in such as are lower.

But the greatest difficulty still remains: for we have supposed the equilibrium of the atmosphere to be broken in the day-time, and restored only in the night; whereas, considering the immense velocity with which the electric fluid moves, the equilibrium ought to be restored in all parts almost instantaneously; yet the aurora borealis never appears except in the night, although its brightness is such as must sometimes make it visible to us did it really exist in the day-time.

In answer to this it must be observed, that though the passage of electricity through a good conductor is instantaneous, yet through a bad conductor it is observed to take some time in passing. As our atmosphere therefore, unless very violently heated, is but a bad conductor of electricity; though the equilibrium in it is broken, it can by no means be instantaneously restored. Add to this, that as it is the action of the sun which breaks the equilibrium, so the same action, extending over half the globe, prevents almost any attempt to restore it till night; when flashes arise from various parts of the atmosphere, gradually extending themselves with a variety of undulations towards the equator.

It now remains to explain only one particularity of the aurora borealis, namely, that its streams do not always move with rapidity, sometimes appearing quite stationary for a considerable time, and sometimes being carried in different directions with a slow motion. To this indeed we can give no other reply, than that weak electric lights have been sometimes observed to put on the same appearance at the surface of the earth; and much more may we suppose them capable of doing so at great heights above it, where the conductors are both fewer in number and much more imperfect. When M. de Romas was making experiments with an electric kite in Italy, a cylinder of blue light about four or five inches diameter was observed surrounding the string. This was in the day-time; but had it been night, he imagined it must have been four or five feet in diameter; and as the string was 780 feet long, it would probably have seemed pyramidal, pointing upwards like one of the streams of the aurora borealis. A still more remarkable appearance, Dr Priestley tells us, was observed by Mr Hartman. He had been making electrical experiments for four or five hours together in a very small room; and upon going out of it, and returning with a light in his hand, walking pretty quick, he perceived a small flame following him at about three feet distance. Being alarmed at this appearance, he stopped to examine it, upon which it vanished. This last instance is very remarkable, and singular in its kind: from both, however, we are sufficiently warranted to conclude, that small portions of our atmosphere may by various causes be so much electrified as to shine, and likewise be moved from one place to another without parting with the electricity they have

Aurora
Borealis.

Aurora
Borealis.
Aurionist.

have received, for a considerable time.

The corona, or circle, which is often formed near the zenith by the aurora borealis, is easily accounted for in the same manner. As this corona is commonly stationary for some time, we imagine it would be a very proper mark whereby to determine the distance of the meteor itself. If an aurora borealis, for instance, was observed by two persons, one at London, and the other at Edinburgh; by noting the stars among which the corona was observed at each place, its true altitude from the surface of the earth could easily be determined by trigonometry.

Under the article ATMOSPHERE it was suggested, that no good proof had been as yet brought for the extreme rarity of the air usually supposed to take place at no very great heights above the earth. The brightness of the meteor there mentioned at 70 miles perpendicular from the surface, as also its figure, seemed to prove the air considerably denser at that distance from the earth. Though the height of the aurora borealis has never been determined, we can scarce imagine it to be greater than that of this meteor, or indeed so great: but although its streams resemble the passage of electric light through a vacuum, it cannot be from thence inferred, that the air is at all in a state similar to the vacuum of an air-pump in those places where the aurora borealis is produced; seeing we have instances of similar appearances being produced in very dense air. The plate of an electrophorus is often so highly electrified, as to throw out flashes from different parts as soon as it is lifted up, and by proper management it may be always made to emit long and broad flashes which shall scarcely be felt by the finger, instead of small, dense, and pungent sparks; so that, though long flashes may be produced in rarefied air, it by no means follows that the same may not also be produced in denser air. As little can we infer any thing from the colours; for we observe the electric spark sometimes white, sometimes blue, and sometimes purple, in the very same state of the atmosphere, and from the same substance.

We shall conclude this article with an account of a paper presented to the Royal Society by Mr Winn, in 1772, wherein he says that the appearance of an aurora borealis is a certain sign of an hard gale of wind from the south or south-west. This he never found to fail in 23 instances; and even thinks, that from the splendor of the meteor, some judgment may be formed concerning the ensuing tempest. If the aurora is very bright, the gale will come on within twenty-four hours, but will be of no long duration; if the light is faint and dull, the gale will be less violent, and longer in coming on, but will also last longer. His observations were made in the English channel, where such winds are very dangerous; and by attending to the aurora, he says he often got easily out of it, when others narrowly escaped being wrecked. This is an exceeding useful observation for sailors: but it cannot be expected that the winds succeeding these meteors should in all places blow from the south-west; though no doubt a careful observation of what winds succeed the aurora borealis, and other meteors, in different parts of the world, might contribute in some measure to lessen the dangers of navigation.

That the aurora borealis ought to be succeeded by winds, may be easily deduced from the hypothesis

last mentioned. If this phenomenon is occasioned by the vast quantity of electric matter conveyed to the equatorial parts of the earth, it is certain that the earth cannot receive any great quantity of this matter at one place without emitting it at another. The electricity, therefore, which is constantly received at the equator, must be emitted nearer the poles, in order to perform its course, otherwise there could not be a constant supply of it for the common operations of nature. It is observed, that electrified bodies are always surrounded by a blast of air, which is sent forth from them in all directions; hence, if the electric matter find a more ready passage through one part of the earth than another, a wind will be found to blow from that quarter. If therefore one of these places happens to be in the Atlantic ocean near the coast of France, or in the Bay of Biscay, the electric matter which has been received at the equator during an aurora borealis will be discharged there some time after, and consequently a wind will blow from that quarter, which will be from the south-west to those ships which are in the English channel. It cannot be imagined, however, that all the matter can be discharged from one place; and therefore, according to the different situations of those electrical vents, winds may blow in different directions; and thus the same aurora borealis may produce a south-west wind in the English channel, and a north-west one in Scotland.

AURUM. See GOLD.

AURUM Fulminans. See CHEMISTRY, n° 356.

AURUM Mosaicum. See CHEMISTRY, n° 413.

AURUM Regina, queen's gold. See QUEEN.

AUSA, a town of Terraconensis, in the middle age called *Aufona*; now *Vich de Ofona*, a town of Catalonia in Spain. E. Long. 2. N. Lat. 41. 50.

AUSI, an ancient and very savage people of Libya. Herodotus tells us that they were unacquainted with marriage, and had all their women in common. The children were brought up by their mothers till they were able to walk: after which, they were introduced to an assembly of the men, whom met every three months; and the man to whom any child first spoke, acknowledged himself its father. They celebrated annually a feast in honour of Minerva, in which the girls divided into two companies, fought with sticks and stones, and those who died of their wounds were concluded not to have been virgins.

AUSIMUM, or AUXIMUM, an ancient Roman colony in the Picenum; now *Osimo* or *Ofimo*, in the March of Ancona in Italy. E. Long. 15. N. Lat. 43. 20.

AUSITÆ, or ÆSITÆ, a tribe of ancient Arabs, supposed by Bochart to have inhabited the land of Uz mentioned in scripture. See ARABIA, n° 4.

AUSONIUS, (in Latin *Decius*, or rather *Decimus*, Magnus Aufonius), one of the best poets of the fourth century, was the son of an eminent physician, and born at Bourdeaux. Great care was taken of his education, the whole family interesting themselves in it, either because his genius was very promising, or that the scheme of his nativity, which had been cast by his grandfather on the mother's side, made them imagine that he would rise to great honour. He made an uncommon progress in classical learning, and at the age of 30 was chosen to teach grammar at Bourdeaux. He was promoted some time after to be professor of rhetoric; in which

office

6
Aurora bo-
realis suc-
ceeded by
south-west
winds.

7
Conjecture
concerning
the reason.

office he acquired so great a reputation, that he was sent for to court to be preceptor to Gratian the emperor Valentinian's son. The rewards and honours conferred on him for the faithful discharge of his office prove the truth of Juvenal's maxim, that when fortune pleases the can raise a man from a rhetorician to the dignity of a consul. He was actually appointed consul by the emperor Gratian, in the year 379, after having filled other considerable posts; for besides the dignity of questor, to which he had been nominated by Valentinian, he was made prefect of the Prætorium in Italy and Gaul after that prince's death. His speech returning thanks to Gratian on his promotion to the consulship is highly commended. The time of his death is uncertain; he was still living in 392, and lived to a great age. The emperor Theodosius had a great esteem for Ausonius, and pressed him to publish his poems. There is a great inequality in his works; and in his manners and his style there is a harshness which was perhaps rather the defect of the times he lived in, than of his genius. Had he lived in Augustus's reign, his verses, according to good judges, would have equalled the most finished of that age. He is generally supposed to have been a Christian: some ingenious authors indeed think otherwise, but, according to Mr Bayle, without just reason. The best edition of his poems is that of Amsterdam in 1671.

AUSTERE, rough, atrigent. Thus an austere taste is such a one as constringes the mouth and tongue; as that of unripe fruits, harsh wines, &c.

AUSTERITY, among moral writers, implies severity and rigour. Thus we say, *Austerity of manners, austerities of the monastic life, &c.*

AUSTIN (St). See *St AUGUSTIN*.

AUSTRAL, something relating to the south: thus the fix signs on the south side of the equinoctial are called *austral signs*.

AUSTRIA, one of the principal provinces of the empire of Germany towards the east; from which situation it takes its name *Ost-ryck*, in the German language signifying the *East Country*. It is bounded on the north by Moravia; on the east by Hungary; on the south by Stiria; and on the west by Bavaria. It is divided into *Upper* and *Lower*. Upper Austria is situated on the south, and Lower Austria on the north side of the Danube. Vienna the capital is in the Upper Austria, which contains several other very considerable towns. The country is very fertile, has a great many mines, and produces vast quantities of sulphur.

In the ninth and tenth centuries, Austria was the frontier of the empire against the barbarians. In 928, the emperor Henry the Fowler, perceiving that it was of great importance to settle some person in Austria who might oppose these incursions, invested Leopold, surnamed the *Illustrious*, with that country. Otto I. erected Austria into a marquisate in favour of his brother-in-law Leopold, whose descendant Henry II. was created duke of Austria by the emperor Frederic Barbarossa. His posterity becoming extinct in 1240, the states of the country, in order to defend themselves from the incursions of the Bavarians and Hungarians, resolved to put themselves under the protection of Henry marquis of Misnia; but Othogor II. king of Bohemia, being likewise invited by a party in the duchy, took possession of it, alleging not only the invitation of the states,

but also the right of his wife, heiress of Frederic the last duke. The emperor Rodolphus I. pretending a right to this duchy, refused to give Othogor the investiture of it; and afterwards killing him in a battle, procured the right of it to his own family. From this Rodolphus the present house of Austria is descended, which for several centuries past has rendered itself so famous and so powerful, having given 14 emperors to Germany, and six kings to Spain.

In 1477, Austria was erected into an archduchy by the emperor Frederic the Pacific, for his son Maximilian, with these privileges: That they shall be judged to have obtained the investiture of the states, if they do not receive it after having demanded it three times; that if they receive it from the emperor, or the imperial ambassadors, they are to be on horseback, clad in a royal mantle, having in their hand a staff of command, and upon their head a ducal crown of two points; and surrounded with a cross like that of the Imperial crown. The archduke is born privy-counsellor to the emperor, and his states cannot be put to the ban of the empire. All attempts against his person are punished as crimes of lese-majesty, in the same manner as those against the king of the Romans, or Electors. No one dared to challenge him to single combat. It is in his choice to assist at the assemblies, or to be absent; and he has the privilege of being exempt from contributions and public taxes, excepting 12 soldiers which he is obliged to maintain against the Turk for one month. He has rank immediately after the electors; and exercises justice in his states without appeal, by virtue of a privilege granted by Charles V. His subjects cannot even be summoned out of his province upon account of law-suits, to give witness, or to receive the investiture of fiefs. Any of the lands of the empire may be alienated in his favour, even those that are feudal; and he has a right to create counts, barons, gentlemen, *poets*, and notaries. In the succession to his states, the right of birth takes place; and, failing males, the females succeed according to the lineal right; and if no heir be found, they may dispose of their lands as they please.

AUTERFOITS *acquit*.

AUTERFOITS *Attaint*.

AUTERFOITS *Convict*.

} See the article *PLEA*
to *Indictment*.

AUTHENTIC, something of acknowledged and received authority. In law, it signifies something clothed in all its formalities, and attested by persons to whom credit has been regularly given. Thus we say, *authentic papers, authentic instruments*.

AUTHOR, properly signifies one who created or produced any thing. Thus God, by way of eminence, is called the *Author of nature*, the *Author of the universe*.

AУТОР, in matters of literature, a person who has composed some book or writing.

AUTHORITY, in a general sense, signifies a right to command, and make one's self obeyed. In which sense, we say, the *royal authority*, the *episcopal authority*, the *authority of a father*, &c. It denotes also the testimony of an author, some apophthegm or sentence of an eminent person quoted in a discourse by way of proof.

Authority is represented, in painting, like a grave matron sitting in a chair of state, richly clothed in a garment embroidered with gold, holding in her right-hand a sword, and in her left a sceptre. By her side

Autochthones
||
Automaton

is a double trophy of books and arms.

AUTOCHTHONES, an appellation assumed by some nations, importing that they sprung, or were produced, from the same soil which they still inhabited. In this sense, *Autochthones* amounts to the same with *Aborigines*. The Athenians valued themselves on their being *Autochthones*, *self-born*, or *γῆναις, earth-born*; it being the prevailing opinion among the ancients, that, in the beginning, the earth, by some prolific power, produced men, as it still does plants. The proper *Autochthones* were those primitive men who had no other parent beside the earth. But the name was also assumed by the descendants of these men, provided they never changed their ancient seat, nor suffered other nations to mix with them. In this sense it was that the Greeks, and especially the Athenians, pretended to be *Autochthones*; and, as a badge thereof, wore a golden grasshopper woven in their hair, an insect supposed to have the same origin.

AUTOCRATOR, a person vested with an absolute independent power, by which he is rendered unaccountable to any other for his actions. The power of the Athenian generals, or commanders, was usually limited; so that, at the expiration of their office, they were liable to render an account of their administration. But, on some extraordinary occasions, they were exempted from this restraint, and sent with a full and uncontrollable authority: in which case they were styled *Autokratōres*. The same people also applied the name to some of their ambassadors, who were vested with a full power of determining matters according to their own discretion. These were denominated *πρεσβυταις Αυτοκρατορικοις*, and resembled our plenipotentiaries.

AUTO DAFE, act of faith. See *Act of Faith*.

AUTODIDACTUS, a person self-taught, or who has had no master, or assistant of his studies, besides himself.

AUTOGRAPH, denotes a person's hand-writing, or the original manuscript of any book, &c.

AUTOLITHOTOMUS, he who cuts himself for the stone. Of this we have a very extraordinary instance given by Reiselius, in the *Ephemerides* of the Academy *Natura Curiosorum*, dec. 1. an. 3. obs. 192.

AUTOMATON, (from *αὐτὸς ἑῷς*, and *μαχεται* *excitator*), a self-moving machine, or one so constructed, by means of weights, levers, pulleys, &c. as to move for a considerable time, as though endued with animal life. According to this description, clocks, watches, and all machines of that kind, are automata.

Under the article *ANDROIDES*, we observed that the highest perfection to which automata could be carried was to imitate exactly the motions and actions of living creatures, especially of mankind, which are more difficultly imitated than those of other animals. Very surprising imitations, however, have been made of other creatures. So long ago as 400 years before Christ, Archytas of Tarentum is said to have made a wooden pigeon that could fly; nor will this appear at all incredible, when we consider the flute-player made by M. Vaucanson, and the chess-player by M. Kempell. Dr Hook is also said to have made the model of a flying chariot, capable of supporting itself in the air. But M. Vaucanson abovementioned hath distinguished himself still more eminently. That gentleman, encouraged by the favourable reception of his flute-player,

Automat
||
Autum

made a duck, which was capable of eating, drinking, and imitating exactly the voice of a natural one. Nay, what is still more surprising, the food it swallowed was evacuated in a digested state; not that it was really in the state of natural excrement, but only considerably altered from what it was when swallowed; and this digestion was performed on the principles of solution, not of trituration. The wings, viscera, and bones, of this artificial duck, were also formed so as very strongly to resemble those of a living animal. Even in the actions of eating and drinking, this resemblance was preserved; the artificial duck swallowed with avidity and vastly quick motions of the head and throat; and likewise muddled the water with his bill, exactly like a natural one.

M. Le Droz of La Chaux de Fonds in the county of Neuchâtel, hath also executed some very curious pieces of mechanism, which well deserve to be ranked with those already mentioned. One was a clock, which was presented to his Spanish majesty, and had, among other curiosities, a sheep, which imitated the bleating of a natural one; and a dog watching a basket of fruit: when any one attempted to purloin the fruit, the dog gnashed his teeth and barked; and if it was actually taken away, he never ceased barking till it was restored. Besides this, he made a variety of human figures, which exhibited motions truly surprising; but all inferior to Mr Kempell's chess-player, which may justly be looked upon as the greatest master-piece in mechanics that ever appeared. See *ANDROIDES*.

AUTONOMIA, a power of living or being governed by our own laws and magistrates. The liberty of the cities which lived under the faith and protection of the Romans, consisted in their *autonomia*, i. e. they were allowed to make their own laws, and elect their own magistrates; by whom justice was to be administered, and not by Roman presidents or judges, as was done in other places which were not indulged the *autonomia*.

AUTRE-EGLISE, a village of Brabant, in the Austrian Netherlands; to which the left wing of the French army extended, when the confederates obtained the victory at Ramillies, in 1706. E. Long. 4. 50. N. Lat. 50. 40.

AUTRICUM, the capital of the Carnutes, a people of Gallia Celtica; afterwards called *Carnotena*, *Carnotenus*, and *Civitas Carnotenus*; now *Chartres* in the Orleanois on the Eure. E. Long. 1. 32. N. Lat. 48. 47.

AUTUMN, the third season of the year, when the harvest and fruits are gathered in. Autumn is represented, in painting, by a man at perfect age, clothed like the vernal, and likewise girded with a starry girdle; holding in one hand a pair of scales equally poised, with a globe in each; in the other hand, a bunch of divers fruits and grapes. His age denotes the perfection of this season; and the balance, that sign of the zodiac which the sun enters when our autumn begins.

Autumn begins on the day when the sun's meridian distance from the zenith, being on the decrease, is a mean between the greatest and the least; which in these countries is supposed to happen when the sun enters Libra. Its end coincides with the beginning of winter. Several nations have computed the years by autumns; the English Saxons, by winters. Tacitus tells

autumn tells us, the ancient Germans were acquainted with all the other seasons of the year, but had no notion of autumn. Lidyat observes of the beginning of the several seasons of the year, that

Dat Clemens hyemem, dat Petrus ver cathedratus, Æquat Urbanus, autumnat Bartholomæus.

Autumn has always been reputed an unhealthy season. Tertullian calls it *tentator valetudinum*; and the satyrists speak of it in the same light, *Autumnus Libitine quæstus acerbæ.*

AUTUMNAL POINT, is that part of the equinox from which the sun begins to descend towards the fourth pole.

AUTUMNAL Signs, in astronomy, are the signs Libra, Scorpio, Sagittarius, through which the sun passes during the autumn.

AUTUMNAL Equinox, that time when the sun enters the autumnal point.

AUTUN, an ancient city of France in the duchy of Burgundy, the capital of the Aunois, with a bishop's see. The length of this city is about three quarters of a mile, and its breadth nearly equal. The river Arroux washes its ancient walls, whose ruins are so firm, and the stones so closely united, that they seem almost to be cut out of the solid rock. In this city are the ruins of three ancient temples, one of which was dedicated to Janus, and another to Diana. Here are likewise a theatre and a pyramid, which last is probably a tomb; it stands in a place called the *field of urns*, because several urns had been found there. Here are also two antique gates of great beauty. The city lies at the foot of three great mountains, in E. Long. 4. 15. N. Lat. 45. 50.

AUVERGNE, a province of France, about 100 miles in length, and 75 in breadth. It is bounded on the north, by the Bourbonnois; on the east, by Torez and Velay; on the west, by Limosin, Quercy, and La Marche; and on the south, by Rovergne and the Cevennes. It is divided into upper and lower; the latter, otherwise called *Limagne*, is one of the finest countries in the world. The mountains of Higher Auvergne render it less fruitful; but they afford good pasture, which feeds great numbers of cattle, which are the riches of that country. Auvergne supplies Lyons and Paris with fat cattle, makes a large quantity of cheese, and has manufactures of several kinds. The capital of the whole province is Clermont.

AUXERRE, an ancient town of France in the duchy of Burgundy, and capital of the Auxerrois, with a bishop's see. The episcopal palace is one of the finest in France, and the churches are also very beautiful. This town is advantageously situated for trade with Paris, on the river Yone. E. Long. 3. 35. N. Lat. 47. 54.

AUXILIARY, whatever is aiding or helping to another.

AUXILIARY Verbs, in grammar, are such as help to form or conjugate others; that is, are prefixed to them, to form or denote the moods or tenses thereof: as, *to have* and *to be*, in the English; *être* and *avoir*, in the French; *ho* and *sono* in the Italian, &c. In the English language, the auxiliary verb *am* supplies the want of passive verbs.

AUXONNE, a small fortified town of France, in the duchy of Burgundy; seated on the river Saone, over which there is a bridge of 23 arches, to facilitate

the running off of the waters after the overflowing of the river. At the end of the bridge is a causeway 2250 paces long. E. Long. 5. 22. N. Lat. 47. 11.

AWARD, in law, the judgment of an arbitrator, or of one who is not appointed by the law a judge, but chosen by the parties themselves for terminating their difference. See **ARBITRER** and **ARBITRATION**.

AWL, among shoemakers, an instrument wherewith holes are bored through the leather, to facilitate the litching or sewing the same. The blade of the awl is usually a little flat and bended, and the point ground to an acute angle.

AWLAN, a small imperial town of Germany, in the circle of Suabia, seated on the river Kochen. E. Long. 11. 15. N. Lat. 48. 52.

AWME, or **AUME**, a Dutch liquid measure containing eight steckans, or 20 verges or verteels, equal to the tierce in England, or to one sixth of a tun of France.

AWN, in botany. See **ARISTA**.

AWNING, in the sea language, is the hanging a sail, tarpawling, or the like, over any part of the ship, to keep off the sun, rain, or wind.

AX, among carpenters, an instrument to hew wood.

Battle-Ax. See **CELT**.

AXATI, a town of ancient Bætica, in the Bætis; now *Lora*, a small city of Andalusia, in Spain, seated on the Guadalquivir. W. Long. 5. 20. N. Lat. 37. 20.

AXBRIDGE, a town of Somersetshire in England, consisting of one long narrow street. W. Long. 2. 20. N. Lat. 51. 30.

AXEL, a small fortified town in Dutch Flanders. E. Long. 3. 40. N. Lat. 51. 17.

AXENUS. See **EUXINE SEA**.

AXHOLM, an island in the north-west part of Lincolnshire in England. It is formed by the rivers Trent, Idel, and Dan; and is about ten miles long and five broad. The lower part is marshy, but produces an odoriferous shrub called *gall*; the middle is rich and fruitful, yielding flax in great abundance, as also alabaster which is used for making lime. The principal town is called *Axe*, and is now very thinly inhabited.

AXIACE, an ancient town of Sarmatia Europea; now *Oxakovu*, the capital of Budziac Tartary. E. Long. 32. 30. N. Lat. 46. 0.

AXILLA, in anatomy, the arm-pit, or the cavity under the upper part of the arm.

AXILLARY, something belonging to or lying near the axilla. Thus, *axillary artery* is that part of the subclavian branches of the ascending trunk of the aorta which passeth under the arm-pits; *axillary glands* are situated under the arm-pits, enveloped in fat, and lie close by the axillary vessels; and *axillary vein* is one of the subclavians which passes under the arm-pit, dividing itself into several branches, which are spread over the arm.

AXIM, a small territory on the gold-coast in Africa. The climate here is so excessively moist, that it is proverbially said to rain 11 months and 29 days of the year. This excessive moisture renders it very unhealthy; but it produces great quantities of rice, water melons, lemons, oranges, &c. Here are also produced vast numbers of black cattle, goats, sheep, tame pigeons, &c. The whole country is filled with beautiful and populous villages, and the intermediate lands well cultivated;

Award

Axim.

Axim
|
Axis.

Axir
|
Aylmer

cultivated; besides which, the natives are very wealthy, from the constant traffick carried on with them by the Europeans for their gold. The capital, which is also called *Axim*, by some *Achombone*, stands under the cannon of the Dutch fort St Antonio. Behind, it is secured by a thick wood that covers over the whole declivity of a neighbouring hill. Between the town and the sea runs an even and spacious shore of beautiful white sand. All the houses are separated by groves of cocoa and other fruit trees, planted in parallel lines, each of an equal width, and forming an elegant vista. The little river *Axim* crosses the town; and the coast is defended by a number of small pointed rocks, which project from the shore, and render all access to it dangerous. The capital is situated in W. Long. 24. 0. N. Lat. 5. 0. This canton is a kind of republic, the government being divided between the Caboceros or chief men, and Manaceros or young men. It must be observed, however, that in their courts there is not even a pretence of justice: whoever makes the most valuable presents to the judges is sure to gain his cause, the judges themselves alleging the gratitude due for the bribes received, as a reason; and if both parties happen to make presents of nearly equal value, they absolutely refuse to give the cause a hearing.

AXIOM, in philosophy, any plain, self-evident, and received notion, that cannot be made more plain and evident by demonstration. It is also an established principle in some art or science.

AXIOPOLIS, a town of the Triballi in Mæsia Inferior; now *Axiopoli*, in Bulgaria. E. Long. 34. 0. N. Lat. 45. 40.

AXIS, in geometry, the straight line in a plain figure, about which it revolves, to produce or generate a solid; thus if a femicircle be moved round its diameter at rest, it will generate a sphere, the axis of which is that diameter.

AXIS, in astronomy, is an imaginary right line supposed to pass through the centre of the earth, and the heavenly bodies, about which they perform their diurnal revolutions.

AXIS, in conic-sections, a right line dividing the section into two equal parts, and cutting all its ordinates at right angles.

AXIS, in mechanics. The axis of a balance is that line about which it moves, or rather turns about. Axis of oscillation is a right line parallel to the horizon, passing through the centre about which a pendulum vibrates.

AXIS in *Peritrochiq*, one of the six mechanical powers, consisting of a peritrochium or wheel concentric with the base of a cylinder, and moveable together with it about its axis.

AXIS, in optics, is that particular ray of light coming from any object which falls perpendicularly on the eye.

AXIS, in architecture. *Spiral axis*, is the axis of a twisted column drawn spirally in order to trace the circumvolutions without. *Axis of the Ionic capital*, is a line passing perpendicularly through the middle of the eye of the volute.

AXIS of a *Vessel*, is an imaginary right line passing through the middle of it perpendicularly to its base, and equally distant from its sides.

AXIS, in botany, is a taper column placed in the

centre of some flowers or catkins, about which the other parts are disposed.

AXIS, in anatomy, the name of the second vertebra of the neck; it hath a tooth which goes into the first vertebra, and this tooth is by some called the *axis*.

AXLE. See *AXIS*.

AXMINSTER, a town of Devonshire, situated on the river *Ax*, in the great road between London and Exeter, in W. Long. 3. 15. N. Lat. 50. 40. It was a place of some note in the time of the Saxons, but now contains only about 200 houses. Here is a small manufactory of broad and narrow cloths, and some carpets are also manufactured after the Turkey manner.

AXUMA, formerly a large city, and capital of the whole kingdom of Abyssinia in Africa, but now reduced to a miserable village scarce containing 100 inhabitants. E. Long. 36. 4. N. Lat. 14. 13.

AXUNGIA, in a general sense, denotes old lard, or the driest and hardest of any fat in the bodies of animals: but more properly it signifies only hogs-lard *.

AXUNGIA Vitri, SANDIVER, or SALT of GLASS, a kind of salt which separates from the glass while it is in fusion. It is of an acrimonious and biting taste. The farriers use it for cleansing the eyes of horses. It is also made use of for cleansing the teeth; and it is sometimes applied to running ulcers, the herpes, or the itch, by way of desiccative.

AXYRIS, a genus of the triandria order, belonging to the monœcia class of plants; of which there are four species, but none of them merit a particular description.

AY, a town of France in Champagne, near the river *Mame*, remarkable for its excellent wines. E. Long. 2. 15. N. Lat. 49. 4.

AYAMONTE, a sea-port town of Andalusia in Spain, with a strong castle built on a rock; seated on the mouth of the river *Guadiana*. It has a commodious harbour, fruitful vineyards, and excellent wine. W. Long. 8. 5. N. Lat. 37. 9.

AYENIA, in botany, a genus of the pentandria order, belonging to the gynandria class of plants. There are three species, all natives of the West Indies.

AYLMER (John), bishop of London, in the reign of queen Elizabeth, was born in the year 1521, at Aylmer-hall in the parish of Tilney, in the county of Norfolk. Whilst a boy, he was distinguished for his quick parts by the Marquis of Dorset afterwards duke of Suffolk; who sent him to Cambridge, made him his chaplain, and tutor to his children. One of these children was the unfortunate lady Jane Gray, who soon became perfectly acquainted with the Latin and Greek languages. His first preferment was to the archdeaconry of Stow in the diocese of Lincoln, which gave him a seat in the convocation held in the first year of Queen Mary, where he resolutely opposed the return to popery, to which the generality of the clergy were inclined. He was soon after obliged to fly his country, and take shelter among the Protestants in Switzerland. On the accession of Queen Elizabeth, he returned to England. In 1562, he obtained the archdeaconry of Lincoln; and was a member of the famous synod of that year, which reformed and settled the doctrine and discipline of the church of England. In the year 1576, he was consecrated bishop of London. He died in the year 1594, aged 73; and was buried in

* See Mat.
Medica,
nº 147.

Ayy
Aza'ca.

St Paul's. He was a learned man, a zealous father of the church, and a bitter enemy to the Puritans. He published a piece entitled, *An harbarowse for faithful and trewe subjects against the late blowne blasfe concerning the government of women*, &c. This was written, whilst he was abroad, in answer to Knox, who published a book at Geneva under this title, *The first blasfe against the monstrous regiment and empire of women*. He is, by Strype, supposed to have published lady Jane Gray's letter to Harding. He also assisted Fox in translating his History of Martyrs into Latin.

AYRY, or AERY, of *Hawks*, a nest or company of hawks; so called from the old French word *aire*, which signified the fame.

AYSCUE (Sir George), a gallant English admiral, descended from a good family in Lincolnshire. He obtained the honour of knighthood from king Charles I. which however did not withhold him from adhering to the parliament in the civil war: he was by them constituted admiral of the Irish seas, where he is said to have done great service to the protestant interest, and to have contributed much to the reduction of the whole island. In 1651 he reduced Barbadoes and Virginia, then held for the king, to the obedience of the parliament; and soon after the restoration behaved with great honour in the war with the Dutch. In the famous engagement in the beginning of June 1666, when Sir George was admiral of the white squadron, his ship the Royal Prince ran upon the Gallop-land; where being surrounded with enemies, his men obliged him to strike. He went no more to sea after this, but spent the rest of his days in retirement.

AYMOUTH, a town of Scotland in the county of Mers, formerly fortified to curb the garrison of Berwick, from which place it is distant six miles. W. Long. 1. 50. N. Lat. 55. 50.

AZAB, in the Turkish armies, a distinct body of soldiery, who are great rivals of the Janizaries.

AZALEA, UPRIGHT HONEYSUCKLE, or ROSE-BAY, a genus of the monogynia order, belonging to the pentandria class of plants. There are six species, of which the most remarkable are the following. 1. The viscosa, with a white flower, is a low-shrub, arising with several stems to the height of two or three feet. The leaves come out in clusters without any order at the end of the shoots, and their edges are set with very short teeth which are rough. The flowers come out in clusters between the leaves, have much the appearance of honeysuckle, and are as well scented. 2. The nudiflora, or red American upright honeysuckle, grows taller than the first; and in its native country will sometimes arrive at the height of 12 feet, but in Britain never rises to above half that height. It hath several stems with oblong smooth leaves. The flower-stalks arise from the division of the branches, which are long and naked, supporting a cluster of red flowers; these are divided at the top into five equal segments which spread open. Another species with bright red flowers was found by Mr Lightfoot upon the tops of many mountains in the highlands of Scotland.—The first two species require a moist soil and a sandy situation, and can only be propagated from slips, as they never produce good seeds in Britain. The autumn is the best time to remove the plants, and their roots ought to be covered in winter.

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AZAI, a town of Touraine in France, seated on the river Indre. E. Long. 10. 35. N. Lat. 47. 18.
AZAMOR, a small sea-port town of the kingdom of Morocco in Africa, formerly very considerable, but ruined by the Portuguese in 1513. W. Long. 7. 0. N. Lat. 32. 50.

AZARAKITES, a sect of Mahometan Arabs *.
AZARIAH, or UZZIAH, king of Judah, succeeded his father Amaziah, 810 years before Christ. He assembled an army of above 300,000 men, with which he conquered the Philistines, and demolished the walls of Gath, Jabniel, and Ashdod; built up the walls of Jerusalem; furnished the city with conduits; and planted gardens and vineyards: but at last, being elated with his prosperity, and resolving to usurp the office of high priest, he was struck with a leprosy, which obliged him to remain shut up in his palace for the rest of his days. He died about 759 years before the Christian æra, and was succeeded by Jonathan his son.—There are several other persons of this name mentioned in the sacred Scriptures.

AZAZEL. This word relates to the ceremony of the scape-goat, under the Jewish religion. Some call the goat itself by this name, as St Jerom and Theodoret. Dr Spencer says, the scape-goat was to be sent to Azazel; by which is meant the devil. Mr le Clerc translates it *precipitium*, making it to be that steep and inaccessible place to which the goat was sent, and where it was supposed to perish.

AZEM, ASEM, ASSAM, or ACHAM, a country of Asia to the north of Ava, but which is very little known to Europeans. It is said to be very fertile, and to contain mines of gold, silver, iron, and lead, all which belong to the king, who, in consequence of enjoying the produce, requires no taxes from his people. They have also great quantities of gum lac, and coarse silk. It is also thought that the inhabitants of Azem were long ago the inventors of cannon and gunpowder; and that from them the invention past to the inhabitants of Pegu, and from thence to the Chinese.

AZIMUTH, in astronomy, an arch of the horizon, intercepted between the meridian of the place and the azimuth, or vertical circle passing through the centre of the object, which is equal to the angle of the zenith, formed by the meridian and vertical circle: or it is found by this proportion, As the radius to the tangent of the latitude of the place, so is the tangent of the sun's or star's altitude, for instance, to the cosine of the azimuth from the south, at the time of the equinox.

Magnetical AZIMUTH, an arch of the horizon intercepted between the azimuth, or vertical circle, passing thro' the centre of any heavenly body, and the magnetical meridian. This is found by observing the object with an azimuth-compass.

AZIMUTH-Compass, an instrument for finding either the magnetical azimuth or amplitude of an heavenly object.

The learned Dr Knight invented some time since a very accurate and useful sea-compass, which is at present used in the navy, and will be described under the article COMPASS. This instrument, with the following contrivance added by the ingenious Mr Smeaton, answers the purposes of an azimuth and amplitude compass.

6 A

The

Azai
Azimuth.

* See Arabias, no 143. et seq.

Azimuth
compass.

The cover of the wooden box being taken off, the compass is in a condition to be made use of in the binnacle, when the weather is moderate: but if the sea runs high, as the inner box is hung very free upon its centre, (the better to answer its other purposes), it will be necessary to slacken the milled nut, placed upon one of the axes that support the ring, and to lighten the nut on the outside that corresponds to it. By this means, the inner box and ring will be lifted up from the edges, upon which they rest, when free; and the friction will be increased, and that to any degree necessary, to prevent the too great vibrations, which otherwise would be occasioned by the motion of the ship.

To make the compass useful in taking the magnetic azimuth or amplitude of the sun and stars, as also the bearings of headlands, ships, and other objects at a distance, the brass edge, designed at first to support the card, and throw the weight thereof as near the circumference as possible, is itself divided into degrees and halves; which may be easily estimated into smaller parts, if necessary. The divisions are determined by means of a cat-gut line, stretched perpendicularly with the box, as near the brass edge as may be, that the parallax, arising from a different position of the observer, may be as little as possible.

Underneath the card are two small weights, sliding on two wires, placed at right angles to each other; which being moved nearer to, or farther from, the centre, counterbalance the dipping of the card in different latitudes, or restore the equilibrium of it, where it happens by any other means to be got too much out of level.

There is also added an index at the top of the inner box, which may be put on and taken off at pleasure; and serves for all altitudes of the object. It consists of a bar, equal in length to the diameter of the inner box, each end being furnished with a perpendicular stile, with a slit parallel to the sides thereof: one of the slits is narrow, to which the eye is applied; and the other is wider, with a small cat-gut stretched up the middle of it, and from thence continued horizontally from the top of one stile to the top of the other. There is also a line drawn along the upper surface of the bar. These four, *viz.* the narrow slit, the horizontal cat-gut thread, the perpendicular one, and the line on the bar, are in the same plane, which disposes itself perpendicular to the horizon, when the inner box is at rest, and hangs free. This index does not move round, but is always placed on, so as to answer the same side of the box.

When the sun's azimuth is desired, and his rays are strong enough to cast a shadow, turn about the wooden box, till the shadow of the horizontal thread, or (if the sun be too low) till that of the perpendicular thread, in one stile, or the light through the slit on the other, falls upon the line in the index bar, or vibrates to an equal distance on each side of it, gently touching the box, if it vibrates too far: observe, at the same time, the degree marked upon the brass edge by the cat-gut line. In counting the degree for the azimuth, or any other angle that is reckoned from the meridian, make use of the outward circle of figures upon the brass edge; and the situation of the index bar, with regard to the card and needle, will always direct upon what quarter of the compass the object is placed.

Azimuth
Azmer.

But if the sun does not shine out sufficiently strong, place the eye behind the narrow slit in one of the files, and turn the wooden box about, till some part of the horizontal, or perpendicular thread appears to intersect the centre of the sun, or vibrate to an equal distance on each side of it, using smoked glass next the eye, if the sun's light is too strong. In this method, another observer will be generally necessary, to note the degree cut by the nonius, at the same time that the first gives notice that the thread appears to split the object.

From what has been said, the other observations will be easily performed: only, in case of the sun's amplitude, take care to number the degree by the help of the inner circle of figures on the card, which are the complements of the outer to 90°; and, consequently, shew the distance from east to west.

The azimuth of the stars may also be observed by night; a proper light serving equally for one observer to see the thread, and the other the degree upon the card.

It may not be amiss to remark farther, that, in case the inner box should lose its equilibrium, and, consequently, the index be out of the plane of a vertical circle, an accurate observation may still be made, provided the sun's shadow is distinct; for, by observing first with one end of the index towards the sun, and then the other, a mean of the two observations will be the truth.

Plate LV. fig. 3. is a perspective view of the compass, when in order for observation; the point of view being the centre of the card, and the distance of the eye two feet. A B is the wooden box. C and D are two milled nuts; by means whereof the axis of the inner box and ring are taken from their edges, on which they move, and the friction increased, when necessary. E F is the ring that supports the inner box. G H is the inner box; and I is one of its axes, by which it is suspended on the ring E F. The magnet or needle appears passing through the centre, together with a small brace of ivory, that confines the cap to its place. The card is a single varnished paper, reaching as far as the outer circle of figures, which is a circle of thin brass; the edge whereof is turned down at right angles to the plane of the card, to make it more stiff. O is a cat-gut line, drawn down the inside of the box, for determining the degree upon the brass edge. PQRS is the index bar, with its two stiles and cat-gut threads; which being taken off from the top of the box, is placed in two pieces, T and V, notched properly to receive it. W is a place cut out in the wood, serving as an handle.

AZIMUTH CIRCLES, called also *azimuths*, or *vertical circles*, are great circles of the sphere intersecting each other in the zenith and nadir, and cutting the horizon at right angles.—These azimuths are represented by the rhumbs on common sea-charts, and on the globe they are represented by the quadrant of altitude, when screwed in the zenith. On these azimuths is reckoned the height of the stars and of the sun when not in the meridian.

AZMER, a town of the East Indies in the dominions of the Great Mogul, capital of a province of the same name, with a very strong castle. It is pretty large, and is sometimes visited by the Mogul himself. It is about 62 leagues distant from Agra. The principal trade of this province is in salt-petre.

Azoga
||
Azure.

AZOGA SHIPS, are those Spanish ships commonly called the *quick-silver ships*, from their carrying quick-silver to the Spanish West Indies, in order to extract the silver out of the mines of Mexico and Peru. These ships, strictly speaking, are not to carry any goods unless for the king of Spain's account.

AZONI, in ancient mythology, a name applied by the Greeks to such of the gods as were deities at large, not appropriated to the worship of any particular town or country; but acknowledged in general by all countries, and worshipped by every nation. These the Latins called *di communes*. Of this sort were the Sun, Mars, Luna, &c.

AZORES, islands in the Atlantic ocean, lying between 25 and 33 degrees of west longitude, and between 35 and 40 degrees of north latitude. They belong to the Portuguese, and are also called the *western isles*, on account of their situation. They were discovered by the Flemings in the 15th century. They are seven in number, *viz.* Tercera, St Michael's, St Mary's, Graciosa, St George's Island, Pico, and Fayal *.

AZOTH, in ancient chemistry, the first matter of metals, or the mercury of a metal; more particularly that which they call the *mercury of philosophers*, which they pretended to draw from all sorts of metallic bodies.

AZOTUS, AZOTH, or ASHDOD, one of the five cities of the Philistines, and a celebrated sea-port on the Mediterranean, situated about 14 or 15 miles south of Ekron, between that and Ascalon. It was in this city that the idol Dagon fell down before the ark; and so strong a place it was, if we may believe Herodotus, that it sustained a siege of 29 years by Psammiticus king of Egypt. It was, however, taken by the Maccabees in a much shorter time; who burnt both city and temple, and with them about 8000 men.

AZURE, in a general sense, the blue colour of the sky. See SKY and BLUE.

AZURE, among painters. This word, which at present signifies in general a fine blue colour, was formerly appropriated to *Lapis Lazuli*, called *azure stone*, and to the blue prepared from it. But since a blue has been extracted from cobalt, custom has applied to it the name of *azure*, although it differs considerably from the former, and is incapable of being used for the same purposes, and particularly for painting in oil.

Azure
||
Azymous.

The former at present is called *lapis lazuli*, or only *lapis*; and the blue prepared from it for painting in oil, is called *ultramarine*.—The name *azure* is generally applied to the blue glass made from the earth of cobalt and vitrifiable matters. This glass, which is called *smalt* when in masses, is called *azure* only when it is reduced to a fine powder. Several kinds of *azure* are distinguished, according to its degrees of beauty, by the names of *fine azure*, *powdered azure*, and *azure of four fires*. In general, the more intense the colour, and the finer the powder, the more beautiful and dear it is. *Azure* is employed to colour starch; hence it has also been called *starch-blue*. It is used for painting with colours, and for a blue enamel.

AZURE, in heraldry, the blue colour in the arms of any person below the rank of a baron. In the escutcheon of a nobleman, it is called *sapphire*; and in that of a sovereign prince, *Jupiter*. In engraving, this colour is expressed by lines or strokes drawn horizontally. —This colour may signify Justice, Perseverance, and Vigilance; but according to G. Leigh, if it is compounded with

Or	} it signifies	Cheerfulness.
Arg.		Vigilance.
Gul.		Readiness.
Ver.		Enterprise.
Pur.		Goodness.
Sab.		Mournfulness.

French Heraldry, *M. Upton*, and his followers, rank this colour before *gules*.

AZYGOS, in anatomy, a vein rising within the thorax, on the right side, having no fellow on the left; whence it is called *azygos*, or *vena sine pari* *.

AZYMITES, in church-history, Christians who admit neither the eucharist with unleavened bread. The word is formed from the Greek, *a priv.* and *ζυμν ferment*.—This appellation is given to the Latin by the Greek church, because the members of the former use fermented bread in the celebration of the eucharist. They also call the Armenians and Maronites by the same name, and for the same reason.

AZYMOS, something unfermented, or made without leaven; as unleavened bread. Sea-bisket is of this kind; and therefore, according to Galen, less wholesome than bread that has been fermented.

* See Anatomy, n^o 387, k.

B.

B, THE second letter of the English and most other alphabets. It is the first consonant, and first mute, and in its pronunciation is supposed to resemble the bleating of a sheep; upon which account Pierius tells us in his hieroglyphics, that the Egyptians represented the sound of this letter by the figure of that animal.

B is also one of those letters which the eastern grammarians call *labial*, because the principal organs employed in its pronunciation are the lips. It is pronounced by pressing the whole length of them together,

and forcing them open with a strong breath. It has a near affinity with the other labials P and V, and is often used for P both by the Armenians and other orientals, as in *Betrus* for *Petrus*, *apfens* for *apfens*, &c.; and by the Romans for V, as in *amabit* for *amavit*, *berna* for *verna*, &c. whence arose that jest of Aurelian on the emperor Bonofus, *Non ut vivat natus est, sed ut bibat*.

Plutarch observes, that the Macedonians changed Φ into B, and pronounced *Bilip*, *Beronicæ*, &c. for *Philip*, *Pheronice*, &c.; and those of Del-

Baal.

phos used B instead of π, as *Bachus* for *παις*, *Bacchor* for *μακρὸς*, &c.—The Latins said *suppono*, *oppono*, for *subpono*, *obpono*; and pronounced *optinuit*, though they wrote *obtinuit*, as *Quintilian* has observed.—They also used B for F or PH: thus, in an ancient inscription mentioned by *Gruter*, *OBRENDARIO* is used for *OFRENDARIO*.

As a numeral, B was used by the Greeks and Hebrews to denote 2; but among the Romans for 300, and with a dash over it (thus *h̄*) for 3000.

B is also used as an abbreviation. Thus B. A. stands for bachelor of arts; B. L. for bachelor of laws; and B. D. for bachelor of divinity. B. F. in the preface to the decrees or senatus-consulta of the old Romans signified *bonum factum*. In music, B stands for the tone above A; as B^b, or ^bB, does for B flat, or the semitone major above A. B also stands for bass; and B. C. for *basso continuo*, or thorough bass.

BĀAL, the same as BĒL, or BELUS; an idol of the Chaldeans, and Phœnicians, or Canaanites. The former worshipped Mars under this name, according to *Josephus* *; who, speaking of *Thorus* the successor of *Ninus*, says, "To this Mars the Assyrians erected the first statue, and worshipped him as a god, calling him *Baal*." It is probable the Phœnicians worshipped the sun under the name of *Baal*; for *Josiah*, willing to make some amends for the wickedness of *Manasseh*, in worshipping *Baal* and all the host of heaven, put to death the idolatrous priests that burnt incense unto *Baal*, to the sun, and to the moon, and to the planets, and to all the host of heaven. He likewise took away the horses that the kings of *Judah* had given to the sun, and burnt the chariots of the sun with fire †.

The temples consecrated to this god, are called in the Scripture *Chamanim*, which signifies places inclosed with walls, in which was kept a perpetual fire. *Maunderell*, in his journey from Aleppo to Jerusalem, observed some traces of these inclosures in Syria. In most of them were no statues; in a few there were some, but of no uniform figure.

The word *baal* (in the Punic language), signifies lord or master; and doubtless meant the supreme Deity, the Lord and Master of the universe. It is often joined with the name of some false god, as *Baal-berith*, *Baal-peor*, *Baal-zephon*, and the like. This deity passed from the Phœnicians to the Carthaginians, who were a colony of the Phœnicians; as appears from the Carthaginian names *Hannibal*, *Asdrubal*, &c. according to the custom of the east, where kings and great men added to their own names those of their gods.

This false deity is frequently mentioned in Scripture in the plural number (*Baalim*): which may signify, either that the name *Baal* was given to several different gods; or that there were many statues, bearing different appellations, consecrated to this idol. *Arnobius* tells us, that *Baal* was of an uncertain sex; and that his votaries, when they called upon him, invoked him thus: *Hear us, whether thou art a god or a goddess*.

Some learned men think, that the *Baal* of the Phœnicians is the *Saturn* of the Greeks; which is probable enough from the conformity there is between the human sacrifices offered to *Saturn*, and those which the Scripture tells us were offered to *Baal*. Others are of opinion, that *Baal* was the Phœnician or Tyrian Hercules, a god of great antiquity in Phœnicia.

Baal, Babel.

BĀAL-BERITH, the god of the Shechemites. *Bochart* conjectures, that *Berith* is the same as *Berac*, the daughter of *Venus* and *Adonis*, who was given in marriage to *Bacchus*; and that she gave her name to the city of *Berith* in Phœnicia, and became afterwards the goddess of it. *Baal-berith* signifies Lord of the covenant, and may be taken for the god who precludes over alliances and oaths, in like manner as the Greeks had their *Ζεύς ὁρκῶν*, and the Romans their *Deus Fidius*, or *Jupiter Pifius*. The idolatrous Israelites, we are told, made *Baal-berith* their god, *Judg.* viii. 33.

BĀAL-PEOR, *Baal-phegor*, or *Beel-phegor*, an idol of the Moabites and Midianites. We are told, that *Israel* joined himself to *Baal-peor*; and that *Solomon* erected an altar to this idol upon the mount of *Olives*. *Baal-peor* has been supposed to be no other than a *Priapus*, and that the worship of him consisted in the most obscene practices. Others have thought, that, as *Baal* is a general name signifying Lord, *Peor* may be the name of some great prince deified after his death. *Mede* imagines, that *Peor* being the name of a mountain in the country of *Moab*, on which the temple of *Baal* was built, *Baal-peor* may be only another name of that deity, taken from the situation of his temple; in like manner as *Jupiter* is styled *Olympius*, because he was worshipped in a temple built on mount *Olympus*. *Selden*, who is of this latter opinion, conjectures likewise, that *Baal-peor* is the same with *Pluto*; which he grounds upon these words of the Psalmist *, "They joined themselves unto *Baal-peor*, and eat the offerings of the dead; though by the sacrifices or offerings of the dead, in this passage, may be meant no more than sacrifices or offerings made to idols, or false gods, who are very properly called the dead, in contradistinction to the true God, who is styled in Scripture the living God."

BĀAL-ZEBUB, *Beel-zebub*, or *Belzebul*; the idol, or god, of the Ekronites. In Scripture he is called the Prince of Devils. His name is rendered the Lord of Flies, or the God-fly; which some think was a mock appellation bestowed on him by the Jews. He had a famous temple and oracle at Ekron. *Ahaziah* king of Israel, having fallen from the terraces of his house into a lower room, and being dangerously hurt, sent to consult this deity, to know if he should be cured of his wounds. The worship of this false god must have prevailed in our Saviour's time, since the Jews accused him of driving out devils in the name of *Belzebul* their prince. *Scaliger* derives the name of this deity from *Baalim-zebubim*, which signifies the Lord of sacrifices.

BABEL, a city and tower undertaken to be built by the whole human race soon after the flood, and remarkable for the miraculous frustration of the attempt by the confusion of languages. As to the situation of ancient Babel, most authors are of opinion that it was exactly in the place where the celebrated city of Babylon afterwards stood. That it was in the same country, appears indisputably from Scripture; but that it was exactly in the same place in what cannot be proved, nor is it a matter of any consequence.

Authors have been much divided about the motive by which the whole race of mankind were induced to join as one man in such an undertaking. Some have imagined that it was out of fear of a second deluge; others, that they knew beforehand that they were to be dispersed through all the different countries of the world, and

* Antiquit. lib. viii. cap. 7.

† 2 Kings xxiii. 5. 23.

* Psalm cvi.

and built this tower in order to defeat the design of the Deity, because having a tower of such vast height as they proposed, those who were at a distance could easily find their way back again. Had either of these been their design, however, it is probable they would have chosen an eminence rather than a plain for the situation of their tower, or indeed that they would have chosen some high mountain such as Ararat for their mark, rather than any tower at all: for though it is said that they designed the top of their tower to reach to heaven, we can scarce suppose them to have been so absurd, as to imagine this possible, in the sense we understand it; and must therefore rather take it in the limited sense in which it is often used by Moses and his countrymen, where they speak of cities walled up to heaven. Others there are who imagine that the top of this tower was not to reach up to heaven, but to be consecrated to the heavens, *i. e.* to the worship of the sun, moon, and stars; of the fire, air, &c. and other natural powers as deities; and therefore that the true Deity interposed in order to prevent a total and irrecoverable defection. Certain it is, that the species of idolatry which takes for the objects of its worship those natural agents, as it is the most ancient, so it is by far the most rational, and the most difficult to be disproved. It is much more difficult, for instance, to prove that the sun, which by his enlivening beams gives vigour to the whole creation, is not a deity, than that a log of wood is not one; and hence, if such a system of religion became universally established among mankind, it would be impossible ever afterwards to eradicate it. Indeed that the scheme at Babel, whatever it was, could have been put in execution by man, seems evident from the interposition of the Deity on the occasion; for we cannot suppose that he would have worked a miracle on purpose to defeat that which would have defeated itself if he had let it alone: and he expressly says, That now nothing could be restrained from them; which intimates very plainly, that, had this scheme gone on, the plan which God had laid for the government of the world would have been totally frustrated: and agreeable to this hypothesis Dr Tennison supposes that the tower was of a pyramidal form, in imitation of the spires of flame; and that it was erected in honour of the sun, as being the most probable cause of drying up the flood.

As to the materials made use of in the building of this tower, the scripture informs us that they were bricks and slime or bitumen. According to an eastern tradition, three years were taken up in making the bricks, each of which was 13 cubits long, ten broad, and five thick. Oriental writers say, that the city was 313 fathoms in length, and 151 in breadth; that the walls were 5533 fathoms high, and 33 in breadth; and that the tower itself was no less than 10,000 fathom, or 12 miles high. Even St Jerome affirms from the testimony of eye-witnesses, who as he says had examined the remains of the tower, that it was four miles high; but Ado makes the height to have been no less than 5000 miles. The only account of its dimensions which can be at all depended upon, (supposing it to have been the same which afterwards stood in the midst of the city of Babylon, and round which Nebuchadnezzar built the temple of Belus), is that given under the article BABYLON; n° 3.

BABEL-MANDEL, the GATE OF MOURNING; a famous strait in the Indian ocean, between the coast of Arabia Felix in Asia, and that of Adel and Zeila in Africa, at the entrance into the Red Sea. By some it is also called the *Straits of Moka*. It is narrow, and difficult to sail through, on account of the sand-banks. At the mouth of the strait is a small island called also *Babel-Mandel*, which is little else than a barren rock.

E. Long. 44. 30. N. Lat. 12. 40.

BABENHAUSEN, a town of Germany in Suabia.

E. Long. 9. 16. N. Lat. 48. 39.

BABINA, (*Commonwealth* of); a society ludicrously so called, which was founded in Poland in the reign of Sigismund-Augustus, in the 16th century. It took its rise from a set of gentlemen, inhabitants of Lublin, who had agreed to meet at a place called *Babina*, merely for the purposes of mirth and jollity. In time their number increased, and they formed themselves into a regular government, under the presidency of a king, senate, and chief magistrates. The magistrates were elected from something which appeared ridiculous in the character or conduct of any of the members. For instance, if any person was meddling or officious, he was immediately created an archbishop; a blundering or disputatious member, was promoted to the speaker's chair; a boaster of his own courage, and vain-glorious *Thrafs*, was honoured with the commission of generalissimo, which was presented him with great ceremony by the subordinate heroes. Those who declined the office for which they were declared qualified, were persecuted with hissings, and abandoned by the society. Thus every vice and every foible was attacked with ridicule; and Babina became, in a short time, the terror, the admiration, and the reformer, of the Polish nation: genius flourished, wit was cultivated, and the abuses which had crept into government and society were corrected by the judicious application of good-humoured satire. Never did any institution of this nature become so general or so useful; but at length it degenerated into a set of buffoons, and banterers of every thing sacred or profane. For several years it was patronised by the kings of Poland, and Sigismund himself became a member, the starosta of Babina telling him jocularly, That "His majesty had certain qualities which entitled him to the first dignity in the commonwealth." Not the least remnant of this society now remains, though it was honoured with extraordinary privileges by kings and emperors.

BABINGTON (Gervase), bishop of Worcester, was born, according to Fuller, in Nottinghamshire; but in what year, is uncertain. He was sent to Trinity college, Cambridge, of which he was made fellow; and, in 1578, was incorporated master of arts at Oxford. He appears, however, to have made Cambridge the place of his residence, where he became an eminent preacher; and, being now doctor in divinity, was made domestic chaplain to Henry earl of Pembroke. In this station he is supposed to have assisted the countsess in her translation of the Psalms. In 1588, he was installed prebend of Hereford, and, in 1591, consecrated bishop of Landaff. In 1594, he was translated to the see of Exeter, and thence to Worcester in 1597. About this time, or soon after, he was made queen's counsellor for the marshes of Wales. He was a considerable benefactor to the library belonging to the cathedral of

Babel,
Babington.

Wor-

Baboon,
Babylon.

Worcester, where he was buried, in May 1610, without a monument. The several historians, who have mentioned this prelate, agree in giving him the character of a learned and pious man. His writings, like those of most of his contemporaries, abound with puns and quaint expressions. His works were printed both in folio and quarto in 1615, and again in folio in 1637, under this title: *The works of the right reverend father in God Gervase Babington, late bishop of Worcester, containing comfortable notes upon the five books of Moses, viz. Genesis, &c. As also an exposition upon the Creed, the Ten Commandments, the Lord's Prayer; with a conference betwixt man's frailtie and faith, and three sermons, &c.*

BABOON, in zoology. See SIMIA.

BABYLON, the capital of the ancient kingdom of Babylonia or Chaldæa, and supposed to have stood in E. Long. 44. o. N. Lat. 32. o. Semiramis is said by some, and Belus by others, to have founded this city. But, by whomsoever it was founded, Nebuchadnezzar was the person who put the last hand to it, and made it one of the wonders of the world. The most famous works in and about it were the walls of the city, the temple of Belus, Nebuchadnezzar's palace, the hanging-gardens, the banks of the river, the artificial lake, and canals.

City described.

The city was surrounded with walls, in thickness 87 feet, in height 350 feet, and in compass 480 furlongs or 60 of our miles. Thus Herodotus, who was himself at Babylon; and though some disagree with him in these dimensions, yet most writers give us the same, or near the same, as he does. Diodorus Siculus diminishes the circumference of these walls very considerably, and takes somewhat from the height of them, as in Herodotus; tho' he seems to add to their breadth, by saying, That six chariots might drive abreast thereon; while the former writes, that one chariot only might turn upon them; but then he places buildings on each side of the top of these walls, which, according to him, were but one story high; which may pretty well reconcile them together in this respect. It is observed, that those who give the height of these walls but at 50 cubits, speak of them only as they were after the time of Darius Hytaspis, who had caused them to be beaten down to that level. These walls formed an exact square, each side of which was 120 furlongs, or 15 miles, in length; and were all built of large bricks cemented together with bitumen, which in a short time grows harder than the very brick and stone which it cements. The city was encompassed, without the walls, with a vast ditch filled with water, and lined with bricks on both sides; and, as the earth that was dug out of it served to make the bricks, we may judge of the depth and largeness of the ditch from the height and thickness of the walls. In the whole compass of the wall there were 100 gates, that is, 25 on each of the four sides, all made of solid brass. Between every two of these gates, at proper distances, were three towers, and four more at the four corners of this great square, and three between each of these corners and the next gate on either side, and each of these towers was ten feet higher than the walls. But this is to be understood only of those parts of the walls where towers were needful for defence. For some parts of them being upon a morass, and inaccessible by an enemy, there the labour and cost

was spared, which, tho' it must have spoiled the symmetry of the whole, must be allowed to have favoured of good economy; though that is what one would not have expected from a prince who had been so determined, as Nebuchadnezzar must have been, to make the city complete both for strength and beauty. The whole number, then, of these towers amounted to no more than 250; whereas a much greater number would have been necessary to have made the uniformity complete all round. From the 25 gates in each side of this square, there was a straight street, extending to the corresponding gate in the opposite wall; whence the whole number of the streets must have been but 50; but then they were each about 15 miles long, 25 of them crossing the other 25 exactly at right angles. Besides these whole streets, we must reckon four half-streets, which were but rows of houses facing the four inner sides of the walls. These four half-streets were properly the four sides of the city within the walls, and were each of them 200 feet broad, the whole streets being about 150 of the same. By this intersection of the 50 streets, the city was divided into 676 squares, each of four furlongs and an half on each side, or two miles and a quarter in compass. Round these squares on every side towards the streets stood the houses, all of three or four stories in height, and beautified with all manner of ornaments; and the space within each of these squares was all void, and taken up by yards, or gardens, and the like, either for pleasure or convenience.

A branch of the Euphrates divided the city into two, running through the midst of it, from north to south; over which, in the very middle of the city, was a bridge, a furlong in length, or rather more, and indeed much more, if we hearken to others, who say it was no less than five stades or furlongs in length, tho' but 30 feet broad, a difference we shall never be able to decide: this bridge, however, is said to have been built with wonderful art, to supply a defect in the bottom of the river, which was all sandy. At each end of this bridge were two palaces; the old palace on the east side, the new one on the west side of the river; the former of which took up four of the squares above-mentioned, and the latter nine. The temple of Belus, which stood next to the old palace, took up another of the same squares.

The whole city stood in a large flat or plain, in a very fat and deep soil; that part or half of it, on the east side of the river, was the old city; and the other on the west was added by Nebuchadnezzar, both being included within the vast square bounded by the walls aforesaid. The form of the whole was seemingly borrowed from Nineveh, which was also 480 furlongs; but, though it was equal in dimensions to this city, it was less with respect to its form, which was a parallelogram, whereas that of Babylon was an exact square. It is supposed, that Nebuchadnezzar, who had destroyed that old seat of the Assyrian empire, proposed that this new one should rather exceed it; and that it was in order to fill it with inhabitants, that he transported such numbers of the captives from other countries hither; though that is what may be disputed, seeing he therein only followed the constant practice of the kings of Assyria, who thought this the most certain means of assuring their conquests either to themselves or their posterity.

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But

But it plainly appears, that it was never wholly inhabited; so that, even in the meridian of its glory, it may be compared with the flower of the field, which flourishes to-day, and to-morrow is no more. It never had time to grow up to what Nebuchadnezzar visibly intended to have made it; for, Cyrus removing the seat of the empire soon after to Shushan, Babylon fell by degrees to utter decay: yet it must be owned, that no country was better able to support so vast and populous a city, had it been completed up to its first design. But so far was it from being finished according to its original design, that, when Alexander came to Babylon, Q. Curtius tells us, "No more than 90 furlongs of it were then built:" which can be no otherwise understood than of so much in length; and, if we allow the breadth to be as much as the length (which is the utmost that can be allowed), it will follow, that no more than 8100 square furlongs were then built upon: but the whole space within the walls contained 14,400 square furlongs; and therefore there must have been 6300 square furlongs remaining unbuilt, which, Curtius tells us, were plowed and sown. And, besides this, the houses were not contiguous, but all built with a void space on each side, between house and house.

The next great work of Nebuchadnezzar was the temple of Belus. The wonderful tower, however, that stood in the middle of it, was not his work, but was built many ages before; that, and the famous tower of Babel, being, as is commonly supposed, one and the same structure. This tower is said to have been composed of eight pyramids¹ one raised above another, and by Herodotus said to have been a furlong in height; but as there is an ambiguity in his expression, it has been disputed whether each of the towers was a furlong in length, or the whole of them taken together. On the latter supposition, which is the most probable, this tower must have exceeded the highest of the Egyptian pyramids by 179 feet, though it fell short of its breadth at the basis by 33. The way to go up was by stairs on the outside round it; whence it seems most likely, that the whole ascent was, by the benching in, drawn in a sloping line from the bottom to the top eight times round it; and that this made the appearance of eight towers, one above the other. Till the times of Nebuchadnezzar, it is thought this tower was all the temple of Belus; but as he did by the other ancient buildings of the city, so he did by this, making great additions thereto, by vast edifices erected round it, in a square of two furlongs on every side, and just a mile in circumference, which exceeded the square at the temple of Jerusalem by 1800 feet. On the outside of these buildings was a wall, which inclosed the whole; and, in consideration of the regularity wherewith this city was to all appearance marked out, it is supposed, that this wall was equal to the square of the city wherein it stood, and so is concluded to have been two miles and an half in circumference. In this wall were several gates leading into the temple, and all of solid brass; which it is thought may have been made out of the brazen sea, and brazen pillars, and other vessels and ornaments of the kind, which Nebuchadnezzar had transported from Jerusalem; for in this temple he is said to have dedicated his spoils from that of Jerusalem.

In this temple were several images or idols of massy gold, and one of them, as we have seen, 40 feet in height; the same, as supposed, with that which Nebuchadnezzar consecrated in the plains of Dura. For gold, &c. though this last is said to have been 60 cubits, or 90 feet high, these dimensions appear so incredible, that it has been attempted to reconcile them into one, by supposing, that in the 90 feet the height of the pedestal is included, and that the 40 feet are for the height of the statue without the pedestal; and, being said to have weighed 1000 talents of Babylon, it is thence computed, that it was worth three millions and a half of our money. In a word, the whole weight of the statues and decorations, in Diodorus Siculus, amounting to 5000 and odd talents in gold, the whole is estimated at above one and twenty millions of our money; and a sum about equal to the same, in treasure, utensils, and ornaments, not mentioned, is allowed for.

Next to this temple, on the east side of the river, stood the old palace of the kings of Babylon, being four miles in circumference. Exactly opposite to it, on the other side of the river, was the new palace built by Nebuchadnezzar, eight miles in circumference, and consequently four times as big as the old one.

But nothing was more wonderful at Babylon than Hanging the hanging-gardens, which Nebuchadnezzar made in gardens. compliance to his wife Amyte; who, being a Mede, and retaining a strong inclination for the mountains and forests of her own country, was desirous of having something like them at Babylon. They are said to have contained a square of four plethra, or 400 feet, on each side; and to have consisted of terraces one above another, carried up to the height of the wall of the city, the ascent from terrace to terrace being by steps ten feet wide. The whole pile consisted of substantial arches upon arches, and was strengthened by a wall surrounding it on every side, 22 feet thick; and the floors on each of them were laid in this order: first, on the tops of the arches was laid a bed or pavement of stones 16 feet long, and four feet broad; over this was a layer of reed mixed with a great quantity of bitumen; and over this two courses of brick, closely cemented together with plaster; and over all these were thick sheets of lead, and on these the earth or mould of the garden. This floorage was designed to retain the moisture of the mould; which was so deep, as to give root to the greatest trees which were planted upon every terrace, together with great variety of other vegetables pleasing to the eye. Upon the uppermost of these terraces was a reservoir, supplied by a certain engine with water from the river, from whence the gardens on the other terraces were supplied.

The other works attributed to Nebuchadnezzar by Berosus and Abydenus, were the banks of the river, the artificial canals, and the great artificial lake said to have been sunk by Semiramis. The canals were cut out on the east side of the Euphrates, to convey the waters of that river, when it overflowed its banks, into the Tigris, before they reached Babylon. The lake was on the west side of Babylon; and, according to the lowest computation, 40 miles square, 160 in compass, and in depth 35 feet, as we read in Herodotus, or 75, as Megasthenes will have it; the former, perhaps, measured from the surface of the tides, and the

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the latter from the tops of the banks that were cast up upon them. This lake was dug to receive the waters of the river, while the banks were building on each side of it. But both the lake, and the canal which led to it, were preferred after that work was completed, being found of great use, not only to prevent all overflows, but to keep water all the year, as in a common reservoir, to be let out, on proper occasions, by sluices, for the improvement of the land.

The banks were built of brick and bitumen, on both sides of the river, to keep it within its channel; and extended on each side throughout the whole length of the city, and even farther, according to some, who reckon they extended 160 furlongs, or twenty miles; whence it is concluded they must have begun two miles and an half above the city, and have been continued an equal distance below it, the length of the city being no more than 15 miles. Within the city they were built from the bottom of the river, and of the same thickness with the walls of the city itself. Opposite to each street, on either side of the river, was a brazen gate in the said wall, with stairs leading down from it to the river: these gates were open by day, and shut by night.

Berosus, Megasthenes, and Abydenus, attribute all these works to Nebuchadnezzar; but Herodotus tells us, the bridge, the banks, and the lake, were the work of a queen after him, called *Nitocris*, who may have finished what Nebuchadnezzar left imperfect, and thence have had the honour this historian gives her of the whole.

The tower or temple stood till the time of Xerxes. But that prince, on his return from the Grecian expedition, having first plundered it of its immense wealth, demolished the whole, and laid it in ruins. Alexander, on his return to Babylon from his Indian expedition, proposed to rebuild it, and accordingly let 10,000 men on work to clear away the rubbish. But, his death happening soon after, a stop was put to all further proceedings in that design. After the death of that conqueror, the city of Babylon began to decline apace; which was chiefly owing to the neighbourhood of Seleucia, built by Seleucus Nicator, as is said, out of spite to the Babylonians, and peopled with 500,000 persons drawn from Babylon, which by that means continued declining till the very people of the country were at a loss to tell where it had stood.

Such is the description we have by ancient historians of the grandeur of this city; which, if these accounts are not exaggerated, must have exceeded every piece of human grandeur that hath yet appeared. Many of the moderns, however, are of opinion that these magnificent descriptions are very far from being true; although it is certain that few other arguments can be brought against the reality of them, than that we do not see things of a similar kind executed in our own days. The following are the arguments used on this subject by the president Coguet.

“Authors have greatly extolled the public works and edifices which once rendered Babylon one of the wonders of the world. We may reduce all these objects to five principal heads: 1. the height of its walls; 2. the temple of Belus; 3. the hanging gardens; 4. the bridge built over the river Euphrates, and the quays which lined that river; 5. the lake and canals dug by

the hand of man to distribute the waters of the Euphrates.

“All these works, so marvellous in the judgment of antiquity, appear to me to have been extremely exaggerated by the authors who have spoken of them. How can we conceive, in effect, that the walls of Babylon could have been 318 feet high, and 81 in thickness, in a compass of near ten leagues?

“I shall say the fame of that square building, known under the name of the temple of Belus. It was composed of eight towers placed one above another, diminishing always as they went up. Herodotus does not tell us what was the height of this monument. Diodorus says, that it surpassed all belief. Strabo fixes it to one stadium, a measure which answers nearly to 600 of our feet. For in the time of this geographer the stadia were much more considerable than in the first ages. The entire mass of this building ought to have been answerable to its excessive height; and this is also the idea that the ancients designed to give us of it. We may judge by the following fact. Xerxes had entirely demolished this temple. Alexander undertook to rebuild it. He designed to begin by clearing the place and removing the ruins. Ten thousand workmen who were employed two months in this work, were not, say they, able to finish it.

“The riches inclosed in the temple of Belus were proportioned to its immensity. Without speaking of the tables and censers, the cups and other sacred vases, of massy gold, there was a statue 40 feet high, which alone weighed 1000 Babylonish talents. In short, according to the inventory that the ancients have given us of the riches contained in this temple, the total sum would amount to two hundred and twenty millions and a half of French livres. Exaggerations like these destroy themselves.

“As to the hanging gardens, according to all appearance they never existed. The silence of Herodotus on a work so singular and so remarkable, determines me to place in the rank of fables all that the other writers have delivered upon this pretended wonder. Herodotus had carefully visited Babylon. He enters into such details as prove that he has omitted none of the rarities of that city. Can we presume that he would have passed over in silence such a work as the hanging gardens? All the authors who have spoken of it are of much later date than this great historian. None of them except Berosus speaks on his own testimony. It is always on the report of others. Diodorus had extracted from Ctesias what he says of these famous gardens. There is also great appearance that Strabo had drawn from the same source. In a word, the manner in which Quintus Curtius expresses himself, sufficiently shews how much the existence of these gardens appeared to him suspicious. He judged they owed the greatest part of it to the imagination of the Greeks.

“Let us now speak of the bridge of Babylon, which the ancients have placed in the number of the most marvellous works of the east. It was near 100 fathoms in length, and almost four in breadth. We cannot deny but that a great deal of art and labour was necessary to lay the foundations, which it could not be easy to settle in the bed of an extremely deep and rapid river, which also rolls along a prodigious quantity of mud, and whose bottom is entirely sandy. They had there-

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therefore taken many precautions to secure the piers of the bridge of Babylon. They were built of stones joined and fastened together with cramps of iron, and their joints filled with melted lead. The front of the piers, turned towards the current of the Euphrates, was defended by buttresses extremely advanced, which diminished the weight and force of the water, by cutting it at a great distance. Such was the bridge of Babylon.

"While we do justice to the skill of the Babylonians in conducting these works, we cannot help remarking the bad taste which at all times reigned in the works of the eastern nations. The bridge of Babylon furnishes a striking instance of it. This edifice was absolutely without grace, or any air of majesty. The breadth of it was in no fort of proportion to its length. The distance between the piers was also very ill contrived. They were distant from each other only 11 feet and a half. Finally, this bridge was not arched. We may judge of its effect on the view.

"The Babylonians, however, were not the only people who were ignorant of the art of turning an arch. This secret, as far as I can find, was unknown to all the people of remote antiquity, who, generally speaking, do not appear to have been very skillful in stone-cutting.

"As for the quays which lined the Euphrates, we may believe that they were grand and magnificent; but I shall not easily believe that they surpassed those which we have daily under our eyes. In this respect, I believe Paris may dispute it, for magnificence, and for the extent of the work, with all the cities of the universe."

BABYLON, a town of Egypt near the eastmost branch of the river Nile, now supposed to be *Grand Cairo*, or this city to stand near its ruins. E. Lon. 31. 12. N. Lat. 30. 5.

BABYLONIA, or CHALDEA, a kingdom of Asia, and the most ancient in the world, being founded by Nimrod the grandson of Ham, who also, according to the margin of our Bibles, founded Nineveh the capital of the kingdom of Assyria. Indeed, these two kingdoms seem to have always continued in such a state of friendship, that we can scarce help thinking they must have been the same, or perhaps Babylonia was for some time a province of Assyria. Nothing certain is known concerning either of them, except what may be gathered from Scripture. From thence we learn, that in the days of Abraham there was a king of *Shinar*, called *Amraphel*, who, under the king of Elam or Persia, made war upon the Canaanites. From this time we have nothing that can be depended upon till the days of Nabonassar, the first king of Babylon mentioned in Ptolemy's canon. It is plain indeed, both from Scripture and profane history, that Babylonia subsisted as a distinct kingdom from Assyria even when the latter was in all its glory. The most probable account of the matter is this. The empire of Assyria was founded by Pul, on the ruins of that of Damascus or Syria, in the days of Menahem king of Judah. This king left two sons, Tiglath-Pileser, and Nabonassar. To the former he bequeathed the empire of Assyria, and to the latter that of Babylon. Tiglath-Pileser resided at Nineveh, the original seat of the Assyrian empire; while Nabonassar, who was the younger brother, held his residence at Babylon. As the two king doms were governed by princes of the same family, we may well suppose a perfect harmony to have reigned between them, the younger branch at Babylon acknowledging

a kind of subjection to the elder at Nineveh. That the Babylonian empire was of Assyrian origin, we are assured by the prophet Isaiah, in the following words. "Behold the land of the Chaldeans: this people was not till the Assyrian founded it for them that dwelt in the wilderness; they set up the towers thereof; they built the palace thereof." As to the kingdom of Assyria, the Scripture mentions only five kings, viz. Pul, Tiglath-Pileser, Shalmaneser, Sennacherib, and Esarhaddon; whose history, as related by the sacred writers, it is needless to mention particularly here. From the days of Nabonassar to Nabopolassar, that is, from the year before Christ 747 to 626, the kings of Babylon made no figure, and were therefore probably in a state of dependence on the kings of Assyria; but at that time, in the reign of *Cyniladan*, the Sardanapalus of the Greeks, Nineveh was taken and destroyed by the Medes and Babylonians, and the seat of the empire transferred to Babylon. This Nabopolassar was the father of the famous Nebuchadnezzar, for whose history we must refer to the sacred writers; and from his time to that of the *Belshazzar* of Daniel, and *Nabonadius* of other authors, the history of Babylon is little better than a mere blank. Of the reduction of Babylon by Cyrus, which happened at this time, we have the following account.

War had been begun betwixt the Medes, Persians, and Babylonians, in the reign of Neriglissar the father of Nabonadius, which had been carried on with very bad success on the side of the Babylonians. Cyrus, who commanded the Median and Persian army, having subdued the several nations inhabiting the great continent from the *Ægean* sea to the Euphrates, bent his march towards Babylon. Nabonadius, hearing of his march, immediately advanced against him with an army. In the engagement which ensued, the Babylonians were defeated; and the king, retreating to his metropolis, was blocked up and closely besieged by Cyrus. The reduction of this city was no easy enterprise. The walls were of a prodigious height, the number of men to defend them very great, and the place stored with all sorts of provisions for 20 years. Cyrus, despairing of being able to take such a city by storm, caused a line of circumvallation to be drawn quite round it, with a large and deep ditch; reckoning, that if all communication with the country were cut off, the besieged would be obliged to surrender through famine. That his troops might not be too much fatigued, he divided his army into twelve bodies, appointing each body its month to guard the trenches; but the besieged, looking upon themselves to be out of all danger by reason of their high walls and magazines, insulted him from the ramparts, and looked upon all the trouble he gave himself as so much unprofitable labour.

After Cyrus had spent two whole years before Babylon, without making any progress in the siege, he at last thought of the following stratagem, which put him in possession of it. He was informed, that a great annual solemnity was to be held at Babylon; and that the inhabitants on that occasion were accustomed to spend the whole night in drinking and debauchery. This he therefore thought a proper time for surprising them; and accordingly sent a strong detachment to the head of the canal leading to the great lake, with orders, at a certain time, to break down the great bank which

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was between the lake and the canal, and to turn the whole current into the lake. At the same time he appointed one body of troops at the place where the river entered the city, and another where it came out; ordering them to march in by the bed of the river as soon as they should find it fordable. Towards the evening he opened the head of the trenches on both sides the river above the city, that the water might discharge itself into them; by which means, and the breaking down of the great dam, the river was soon drained. Then the two abovementioned bodies of troops, according to their orders, entered the channel; the one commanded by Gobryas, and the other by Gadates; and finding the gates all left open by reason of the disorders of that riotous night, they penetrated into the very heart of the city without opposition; and meeting, according to agreement, at the palace, they surprised the guards, and cut them in pieces. Those who were in the palace opening the gates to know the cause of this confusion, the Persians rushed in, took the palace, and killed the king, who came out to meet them sword in hand. Thus an end was put to the Babylonian empire; and Cyrus took possession of Babylon for one called in Scripture *Darius the Mede*, most probably *Cyaxares II.* uncle to Cyrus. From this time Babylonia never was erected into a distinct kingdom, but hath always followed the fortune of those great conquerors who at different times have appeared in Asia. It is now frequently the object of contention between the Turks and Persians.

The Assyrian and Babylonian history, according to the Greek writers, is so dark and full of fable, that we have not thought proper to trouble our readers with it, especially as the whole is contained in the transactions of a few sovereigns, viz. *Ninus*, *Semiramis*, *Ninyas*, and *Sardanapalus*, kings of Assyria, and *Belsar*, or *Nabonassar*, the first king of Babylon: See these articles. Concerning the nature of the country, manners, customs, &c. of the ancient Babylonians, the following account is collected by M. Sabbathier.

"As all the nations under the dominion of Cyrus, beside the ordinary tributes, were obliged to maintain him and his army, the monarch and his troops were supported by all Asia. The country of Babylon alone was obliged to maintain him four months of the year; its fertility, therefore, yielded a third of the produce of Asia. The government of this country, which the Persians termed *satrapy*, was richer, and more extensive, than any of the rest. It maintained for the king, besides the war-horses, a stud of 800 stallions, and 16,000 mares. So great a number of Indian dogs were likewise bred in this province for the king, that four of its cities kept those animals; and in return, they were exempted from all taxes and tributes.

"It rained very seldom in this country, according to Herodotus. The earth was watered by the river, which was here diffused by human industry, as the Nile is over Egypt by nature: for all the country of Babylon was divided by canals, the greatest of which was navigable, and flowed from south to north, from the Euphrates to the Tigris. In short, it was one of the finest countries for corn in the world; but for producing trees, the fig-tree, the vine and the olive, it was not famous. It was so luxuriant in grain, that it commonly yielded a hundred times more than what was

fown; and in its good years it yielded three hundred times more than it received. The leaves of its wheat and barley were four inches broad. "Tho' I know," says Herodotus, "that the millet and the sesame of that country grow to the size of trees, I will not describe them particularly; lest those who have not been in Babylonia should think my account fabulous."

"They had no oil but what they made from Indian corn. The country abounded with palm-trees, which grew spontaneously; and most of them bore fruit, of which the inhabitants made bread, wine, and honey. They cultivated these trees and their fig-trees in the same manner. Some of them, as of other trees, the Greeks called *male ones*. They tied the fruit of the male to the trees which bore dates; that the mosquito, leaving the male, might cause the date to ripen, by penetrating it; for without that assistance it came not to maturity. Mosquitos bred in the male palms, as in the wild fig-trees.

"But we must not here omit to give an account of the peculiar and surprising construction of their boats of skins, in which they sailed along the river to Babylonia. These boats were invented by the Armenians, whose country lay north from Babylonia. They made them with poles of willow, which they bent, and covered with skins: the bare side of the skins they put outwards; and they made them so tight, that they resembled boards. The boats had neither prow nor stern, but were of a round form, like a buckler. They put straw on the bottom. Two men, each with an oar, rowed them down the river, laden with different wares, but chiefly with palm-wine. Of these boats some were very large, and some very small. The largest carried the weight of 500 talents. There was room for an ass in one of their small boats; they put many into a large one. When they had unloaded, after their arrival at Babylon, they sold the poles of their boats, and the straw; and loading their asses with the skins, returned to Armenia: for they could not sail up the river, its current was so rapid. For this reason they made their boats of skins, instead of wood; and on their return to Armenia with their asses, they applied the skins to their former use.

"As to their dress, they wore a linen shirt, which came down to their feet. Over it they wore a woollen robe; their outer garment was a white vest. Their shoes resembled those of the Thebans. They let their hair grow. On their heads they wore a turban. They rubbed their bodies all over with fragrant liquors. Each man had a ring on his finger; and an elegant cane in his hand, with an apple at the top, or a rose, a lily, or an eagle, or some other figure: for they were not suffered to use canes without devices.

"With regard to their policy, Herodotus thinks that their best law was one which the Heneti, an Illyrian people, likewise observed in every town and village. When the girls were marriageable, they were ordered to meet in a certain place, where the young men likewise assembled. They were then sold by the public crier; but he first sold the most beautiful one. When he had sold her at an immense price, he put up others to sale, according to their degrees of beauty. The rich Babylonians were emulous to carry off the finest women, who were sold to the highest bidders. But as the young

Babylonia. young men who were poor could not aspire to have fine women, they were content to take the ugliest with the money which was given them: for when the crier had fold the handfomeft, he ordered the ugliest of all the women to be brought; and asked, if any one was willing to take her with a small sum of money. Thus she became the wife of him who was most easily satisfied; and thus the finest women were fold; and from the money which they brought, small fortunes were given to the ugliest, and to those who had any bodily infirmity. A father could not marry his daughter as he pleased; nor was he who bought her allowed to take her home, without giving security that he would marry her. But, after the sale, if the parties were not agreeable to each other, the law enjoined that the purchase-money should be restored. The inhabitants of any of their towns were permitted to buy wives at these auctions. Such were the early customs of the Babylonians.

"But they afterwards made a law, which prohibited the inhabitants of different towns to intermarry, and by which husbands were punished for treating their wives ill. When they had become poor by the ruin of their metropolis, fathers used to prostitute their daughters for gain. There was a sensible custom among the Babylonians, worthy to be related. They brought their sick into the forum, to consult those who passed, on their diseases; for they had no physicians. They asked those who approached the sick, if they ever had the same distemper? if they knew any one who had had it? and how he was cured? Hence, in this country, every one who saw a sick person was obliged to go to him, and inquire into his distemper.

"They embalmed their dead with honey; and their mourning was like that of the Egyptians.

"There were three Babylonian tribes, who lived only upon fish, and who prepared them in the following manner: they dried them in the sun, and then beat them in a mortar to a kind of flour, which after they had sifted through linen, they baked it in rolls.

"The Babylonians at first worshipped only the sun and the moon; but they soon multiplied their divinities. They deified Baal, Bel, or Belus, one of their kings, and Merodach-Baladan. They also worshipped Venus, under the name of *Myllitta*. She and Belus were the principal deities of the Babylonians. They counted their day from sun-rise to sun-rise. They solemnized five days of the year with great magnificence, and almost the same ceremonies with which the Romans celebrated their Saturnalia.

"The Babylonians were very much addicted to judicial astrology. Their priests, who openly professed that art, were obliged to commit to writing all the events of the lives of their illustrious men; and on a fancied connection between those events and the motions of the heavenly bodies, the principles of their art were founded. They pretended that some of their books, in which their historical transactions and revolutions were accurately compared with the courses of the stars, were thousands of years old. This assertion of their judicial astrologers we may reasonably dispute; but that their astronomers had made a long series of observations, is incontestably true. It is certain that some of those observations were extant in the days of Aristotle, and that they were older than the empire of the Babylonians. See *History of ASTRONOMY*.

BABYLONICS, BABYLONICA, in literary history, a fragment of the ancient history of the world, ending at 267 years before Christ; and composed by Berofus, or Berossus, a priest of Babylon, about the time of Alexander. Babylonicus are sometimes also cited in ancient writers by the title of *Caldæici*. The babylonicus were very consonant with scripture, as Josephus and the ancient Christian chronologers assure; whence the author is usually supposed to have consulted the Jewish writers. Berofus speaks of an universal deluge, an ark, &c. He reckons ten generations between the first man and the deluge; and marks the duration of the several generations by *sarai*, or periods of 223 lunar months; which, reduced to years, differ not much from the chronology of Moses.—The babylonicus consisted of three books, including the history of the ancient Babylonians, Medes, &c. But only a few imperfect extracts are now remaining of the work; preserved chiefly by Josephus, and Syncellus, where all the passages of citations of ancient authors out of Berofus are collected with great exactness. Annianus of Viterbo, to supply the loss, forged a complete Berofus out of his own head. The world has not thanked him for the imposture.

BABYROUSSA, in zoology, a synonyme of a species of fus. See *Fus*.

BAC, in navigation, is used for a praam, or ferry-boat.

BAC, in brewing, a large flat kind of tub, or vessel, wherein the wort is put to stand and cool before boiling. The ingredients of beer pass through three kinds of vessels. They are mashed in one, worked in another, and cooled in a third called *bac* or *coolers*.

BAC, in distillery, vessels into which the liquor to be fermented is pumped from the cooler, in order to be worked with yeast.

BACK-MAKER, is one who makes liquor-backs, under-backs, coolers, mash-tuns, working-tuns, &c. for the brewers. The workmanship is partly carpentry, in a particular manner, for it must be tight enough to hold liquor; and partly cooperage, *viz.* the mash-tun, or vat, which is hooped. There are not many of this trade; and it requires chiefly strength, with a little art. A small stock of stuff, besides tools, will set a man up tolerably well; but, with 200l or 300l. he will make a good figure in business.

BACA, or **BAZA**, a town of Spain in the kingdom of Granada. W. Long. 3. 6. N. Lat. 37. 18. It is situated in a valley called *Hoya de Baza*. It is encompassed with old walls, and has a castle half ruined. It contains about 4000 houses, but has nothing remarkable except the church dedicated to the Virgin Mary. The land about it is well cultivated for half a league round, and is fertile in wheat, wine, honey, hemp, and flax, being watered by the little river Guadalatin.

BACACUM, a town of the Nervii in Gallia Belgica; now *Bavay*, in Hainault. E. Long. 3. 40. N. Lat. 50. 25.

BACAIM, a handsome sea-port town of the kingdom of Visapur on the Malabar coast in Asia. It is subject to the Portuguese; and stands in E. Long. 73. 10. N. Lat. 19. 0.

BACASERAY, a town in the peninsula of Crim Tartary, and, as the khan usually takes up his residence there, it may be considered as the capital of the country.

Bacca. E. Long. 35. 10. N. Lat. 45. 30.

Bacchus.

BACCA, BERRY, in botany, is used to signify such fruits as consist of a pericarpium full of juice and seeds, without any valves.

BACCARACH, a town of Germany in the lower Palatinate; formerly imperial and free, but now subject to the elector Palatine. It is famous for excellent wine; and is situated on the Rhine, in E. Long. 7. 5. N. Lat. 49. 57.

BACCHANALIA, feasts celebrated in honour of Bacchus by the ancients. The two most remarkable were called the *greater* and *lesser*. The latter, called *lenæa*, from a word signifying a *wine-press*, were held in the open fields about autumn; the greater, called *Dionysia*, from one of the names of Bacchus, were celebrated in the city, about the spring-time. Both these feasts were accompanied with games, spectacles, and theatrical representations, and it was at this time the poets contended for the prize of poetry. Those who were initiated into the celebration of these feasts, represented some Silenus; others, Pan; others, Satyrs; and in this manner appeared in public, night and day, counterfeiting drunkenness, dancing obscenely, and committing all kinds of licentiousness and debauchery. See the article BACCHUS.

BACCHARIS, PLOUGHMAN'S SPIKENARD, a genus of the polygamia superflua order, belonging to the syngenesia class of plants. Of this genus there are seven species, all natives of warm climates; but none of them merit notice except the two following. 1. The *ivæfolia*, or African tree-groundfell, is a native of the Cape of Good Hope, as also of Peru and other warm parts of America. It grows to the height of five or six feet; and though there is little beauty in the flower, has been long admitted into the gardens of the curious. It is pretty hardy, and will live abroad in moderate winters in England, but is usually kept in green-houses, and placed abroad only in summer. It may be propagated either by cuttings, or by seeds, which ripen well in this country. 2. The *halimifolia*, or Virginia groundfell-tree, is a native of Virginia and other parts of North America. It grows about seven or eight feet high, with a crooked shrubby stem; and flowers in October: the flowers are white, and not very beautiful; but the leaves continuing green, has occasioned this shrub to be admitted into many curious gardens. It may be propagated by cuttings; and will live very well in the open air, though severe frost will sometimes destroy it.

BACCHINI (Benedict), a Benedictine monk, and one of the most learned men in his time, was born at Borgo San Domino, in 1651; and wrote a great number of books, in Latin and Italian, the most considerable of which is a Literary Journal. He died at Bologna, in 1721, aged 70.

BACCHUS, a follower of Aristotle, supposed by Fabricius to have been tutor to the emperor Marcus Antoninus, and consequently to have lived about A. C. 140. He wrote in Greek a very short introduction to music in dialogue, which, with a Latin translation thereof, Meibomius has published. It seems it was first published in the original by Merfennus, in his Commentary on the first six chapters of Genesis; and that afterwards he published a translation of it in French, which Meibomius, in the preface to his edition of the

ancient musical authors, censures as being grossly erroneous.

BACCHUS, in ancient poetry, a kind of foot composed of a short syllable, and two long ones; as the word [ivari]. It takes its name from the god Bacchus, because it frequently entered into the hymns composed in his honour. The Romans called it like-wise *anotrius*, *tripodius*, *saltans*.

BACCHUS, in Heathen mythology, the god of wine, with whose fabulous adventures every school-boy is acquainted. This personage is seldom named in modern times but as a sensual encourager of feast and jollity; but he was regarded in a more respectable light by the ancients, who worshipped him in different countries under the following appellations: in Egypt, he was called *Osiris*; in Mylia, *Fanaces*; in India, *Dionysius*; *Liber*, throughout the Roman dominions; *Adoneus*, in Arabia; and *Pentheus*, by the Lucanians. Mythologists furnish reasons for all these different names given to the same God, which may be seen in the second volume of Banier's Mythology.

It is natural to suppose that the Greeks and Romans, as usual, bestowed upon the one Bacchus which they worshipped, the several actions and attributes of the many divinities known by that name, and by other equivalent denominations in different countries. However, antiquity chiefly distinguished two gods under the title of *Bacchus*: that of Egypt, the son of Ammon, and the same as Osiris; and that of Thebes in Boeotia, the son of Jupiter and Semele.

The Egyptian Bacchus was brought up at Nyfa, a city of Arabia Felix, whence he acquired the name of *Dionysius*, or the God of Nyfa; and this was the conqueror of India. Though this Bacchus of the Egyptians was one of the elder gods of Egypt, yet the son of Semele was the youngest of the Grecian deities. Diodorus Siculus tells us, that Orpheus first deified the son of Semele by the name of Bacchus, and appointed his ceremonies in Greece, in order to render the family of Cadmus, the grandfather of the Grecian Bacchus, illustrious.

The great Bacchus, according to Sir Isaac Newton, flourished but one generation before the Argonautic expedition. This Bacchus, says Hermippus, was potent at sea, conquered eastward as far as India, returned in triumph, brought his army over the Hellespont, conquered Thrace, and left music, dancing, and poetry there. And, according to Diodorus Siculus, it was the son of Semele who invented farces and theatres, and who first established a music-school, exempting from all military functions such musicians as discovered great abilities in their art; on which account, says the same author, musicians formed into companies have since frequently enjoyed great privileges.

Dr Burney * observes, that the dithyrambics which gave birth to dramatic representations, are as ancient as the worship of Bacchus in Greece; and there is little doubt but that the ceremonies of his mysteries gave rise to the pomp and illusions of the theatre. Many of the most splendid exhibitions upon the stage for the entertainment of the people of Athens and Rome, being performed upon the festivals of Bacchus, gave occasion to the calling all those that were employed in them, whether for singing, dancing, or reciting,

Bacchus,
Bacchus.

* Hist. of
Music,
p. 298. &c.
seq.

Bacchus.

citing, *servants of Bacchus*.

Pausanias, in his *Attica*, speaks of a place at Athens, consecrated to *Bacchus the singer*; this named, he says, for the same reason as Apollo is called the *chief and conductor* of the muses. Whence it should seem that Bacchus was regarded by the Athenians not only as the god of wine, but of song; and it must be owned, that his followers, in their cups, have been much inclined to singing ever since. Indeed we are certain, that in none of the orgies, processions, triumphs, and festivals, instituted by the ancients to the honour and memory of this prince of *bons vivans*, music was forgotten, as may be still gathered from ancient sculpture, where we find not only that musicians, male and female, regaled him with the lyre, the flute, and with song; but that he was accompanied by fawns and satyrs playing upon timbrels, cymbals, bagpipes, and horns: these Suidas calls his minstrels; and Strabo gives them the appellations of *Bacchi, Sileni, Satyri, Bacches, Lenæ, Thyæ, Mamillones, Naiades, Nymphæ, and Tityri*.

These representations have furnished subjects for the finest remains of ancient sculpture; and the most voluptuous passages of ancient poetry are descriptions of the orgies and festivals of Bacchus.

The *orgia*, or feasts and sacrifices performed in honour of this god in Greece, were chiefly celebrated on the mountains of Thrace by wild distracted women called *Bacchæ*. The *Orgia* were likewise called *Orphica*, from their founder Orpheus. However, Servius says, that at first *Orgia* was a common name for all kinds of sacrifices among the Greeks, and of the same import with the word *ceremonia* among the Romans. Virgil calls the feasts of Bacchus *Orgia tritærica*, from their being celebrated once in three years.

They had certainly their rise in Egypt, where Osiris was the model of the Grecian Bacchus; from thence they passed into Greece, Italy, Gaul, and were adopted almost throughout the whole pagan world. They were at first performed with simplicity and decorum; but afterwards they degenerated into so much folly and licentiousness, that historians assure us the debaucheries practised in them during the night time were so enormous, as to oblige the Roman senate, in the 556th year of the city, 186 B. C. to abolish them entirely throughout the Roman dominions. After their prohibition, however, recorded at large by Livy *, several persons seem to have continued their use: Tacitus† gives an elegant description of the Bacchanalia as celebrated by Messalina. The orgies of Bacchus furnished Æschylus with a subject for one of his tragedies; from whence may be acquired a truer idea of them before their corruption than from any other remains of antiquity.

The orgies being a commemoration of the march of the elder Bacchus into India, and that prince having had in his train musicians of both sexes, satyrs, and fawns, or men equipped like fawns and satyrs, these were afterwards employed in the processions and orgies, and formed into bands of music, playing upon drums and cymbals, and crying out *Evohe Bacche!*

In the Justinian garden at Rome there is a marble vase of most precious workmanship, upon which is a representation of these orgies of Bacchus. This vase, from the beauty of the sculpture, is supposed to be by the hand of Saurus. The whole pomp of one of these

processions is there admirably represented; in which are introduced Bacchus, the Bacchanals, the Mænades, the players on flutes, matrons, and virgins, with the Crotalum, or cymbalum, and tympanum; fawns and satyrs, holding in their hands vases and cups; priests leading the victims destined for sacrifice, such as the boar, the he-goat, and the bull; and, lastly, old Silenus, drunk, upon his ass, which he is hardly able to guide.

With respect to *Bacchanalian Songs*, as the ancient Greeks and modern French have at all times had the best wine to drink, they seem to have been the most happy in singing its praises. Anacreon will authorise this opinion with respect to the Greeks; and the French have many Anacreons, among whom may be numbered the abbe de Chaulieu, La Chapelle, La Fare, and St Aulaire.

But Bacchus is said by Diodorus † to have invented † *Lit. iv.* beer, for the use of mankind in such parts of the globe as are unfit for the culture of the grape; and our gluey potatoes, with the black juice of Oporto, have sometimes inspired the bards of this island with wit and jollity in their drinking songs. And indeed our catches, by the ingenuity of the musical composer, are perhaps fraught with more pleasantries, and are productive of more genuine mirth, than the Bacchanalian hymns of any other people on the globe.

BACCHYLIDES, a famous Greek poet, was the nephew of Simonides, and the cotemporary and rival of Pindar. Both sung the victories of Hiero at the public games. Besides odes to athletic victors, he was author of *Love Verses; Profodies; Dithyrambics; Hymns; Pæans; Hyporchemes; Parthenia*, or songs to be sung by a chorus of virgins at festivals. The chronology of Eusebius places the birth of Bacchylides in the 82^d Olympiad, about 450 B. C.

BACCIO, or BACCUS, (Andrew), a celebrated physician of the 16th century, born at St Elpidio. He practised physic at Rome with great reputation, and was first physician to pope Sixtus V. The most scarce and valuable of his works are, 1. *De thermis*. 2. *De naturali vinorum historia*. 3. *De venenis et antidotis*. 4. *De gemmis ac lapidibus pretiosis*.

BACHELOR, or BATCHELOR, a man who still continues in the state of celibacy, or who was never married.

BACHELOR is a word of uncertain etymology, it not being known what was its original sense. Junius derives it from *BACCABUS*, *foolish*; Menage, from *Bai Chevalier*, a knight of the lowest rank; Spelman, from *Baculus*, a staff; Cujas, from *Buccella*, an allowance of provision. The most probable derivation of it seems to be from *Bacca Laurus*, the berry of a laurel or bay; bachelors being young and of good hopes, like laurels in the berry. In Latin, *Baccalaureus*.

BACHELOR, was anciently a denomination given to those who had attained to knighthood, but had not a number of vassals sufficient to have their banner carried before them in the field of battle; or if they were not of the order of bannerets, were not of age to display their own banner, but obliged to march to battle under another's banner. It was also a title given to young cavaliers, who, having made their first campaign, received the military girdle accordingly. And it served to denominate him who had overcome another in a tournament,

Bacchus
Bachelor.Bacchus
ibid.xxix.
et seq.
anal. ii.

Bachelors
||
Back.

Back,
Backings

namement, the first time he ever engaged.

Knights BACHELORS were so called, as being the lowest order of knights, or inferior to bannerets.

BACHELORS, in an university-sense, are persons that have attained to the baccalaureate, or who have taken the first degree in the liberal arts and sciences. Before a person can be admitted to this degree at Oxford, it is necessary that he study there four years; three years more may entitle him to the degree of master of arts; and in seven years more he may commence bachelor of divinity. At Cambridge, the degrees are usually taken much the same as at Oxford, excepting in law and physic; in either of which the bachelor's degree may be taken in six years. In France, the degree of bachelor of divinity is attained in five year's study; that is, in two years of philosophy, and three of divinity.

BACHERAC, a town of the Palatine of the Rhine, situated on the western shore of that river, in E. Long. 7°. and N. Lat. 58°. It is remarkable for excellent wine, from thence called *Bacherac*.

BACHIAN, one of the Molucca islands, belonging to the Dutch; situated under the equator, in E. Long. 125°.

BACHU, a city of Shirvan in Persia, and the best haven in the Caspian sea. It is defended by a double wall, as also by a ditch and redoubts, made by the Russians when they were masters of the place. It had a sumptuous castle, but it is reduced to a ruinous state by the Russians. Formerly many merchants resided here, and carried on a considerable traffick in raw silk; but that commerce is now given up. All the country round is much impregnated with sulphur, which renders the water very unpleasing. The neighbourhood of this city supplies the countries adjacent with naphtha, brimstone, and rock-salt; and is the only place thereabouts which produces saffron. Round Bachu are several very steep craggy mountains, on which are strong watch-towers. E. Long. 49. S. N. Lat. 40. o.

BACK, in anatomy. See *BACK-BONE*.

BACK, in the menage, and among farriers. A horse's back should be straight, not hollow, which is called *saddle backed*: horses of this kind are generally light, and carry their heads high, but want in strength and service. A horse with a weak back is apt to stumble. In the French riding-schools, to mount a horse *a dos*, is to mount him bare-backed, without a saddle.

BACK-BONE, or SPINE. See *ANATOMY*, n° 29, &c.

BACK-GAMMON, an ingenious game played with dice and tables, to be learned only by observation and practice.

BACK-Painting, the method of painting mezzotint prints, passed on glass, with oil-colours *.

* See *Mix-*
colours.

The art consists chiefly in laying the print upon a piece of crown-glass, of such a size as fits the print.

In order to do this, take your print, and lay it in clean water for two days and two nights, if the print be on very strong, close, and hard gummed paper; but if upon an open, soft, spongy paper, two hours will sometimes suffice, or more, according as the paper is.

The paper or picture having been sufficiently soaked, take it out and lay it upon two sheets of paper, and cover it with two more; and let it lie there a little to soak out the moisture.

In the mean time, take the glass the picture is to be

put upon, and set it near the fire to warm; take Strasbourg turpentine, warm it over the fire till it is grown fluid, then with a hog's-hair brush spread the turpentine very smoothly and evenly on the glass.

When this has been done, take the mezzotint print from between the papers, and lay it upon the glass; beginning first at one end, rubbing it down gently as you go on, till it lie close, and there be no wind bladders between.

Then, with your fingers, rub or roll off the paper from the back-side of the print, till it looks black, i. e. till you can see nothing but the print, like a thin film, left upon the glass, and set it by to dry.

When it is dry, varnish it over with some white transparent varnish, that the print may be seen through it; and then it is fit for painting.

The utmost care will be necessary in rubbing or rolling the paper of the print, so as not to tear it, especially in the light parts.

You may, instead of soaking your prints two days and two nights, roll them up and boil them for about two hours, more or less, according to the quality of the paper, in water; and that will render it as fit for rubbing, rolling, or peeling, as the other way.

This being done, and your oil-colours prepared, ground very fine, and tempered up very stiff, lay on the back-side of the transparent prints such colours as each particular part requires; letting the master-lines of the print still guide your pencil, and so each particular colour will lie fair to the eye on the other side of the glass, and look almost as well as a painted piece, if it be done neatly.

The shadows of the print are generally sufficient for the shadow of every colour; but if you have a mind to give a shadow by your pencil, then let the shadows be laid on first, and the other colours afterward.

In laying on colours in this kind of back-painting, you need not be curious as to the laying them on smooth. This is not at all requisite here, where the chief aim is only to have the colours appear well on the fore side of the print; and therefore the only care to be used in this work, is to lay the colours on thick enough, that its body may strike the colour of it plainly through the glass.

BACK-STAFF, a name formerly given to a sea-quadrant invented by Captain Davis; because the back of the artist is turned towards the sun at the time of observation. See *QUADRANT*.

BACK-STAYS, of a ship, are ropes belonging to the main-mast and fore-mast, and the masts belonging to them; serving to keep them from pitching forwards or overboard.

BACK-TACK, in Scots law: When a wadsetter, instead of possesting the wadset-lands, grants a tack thereof to the reverfor for payment of a certain sum in name of tack-duty, that tack is called a *back tack* *.

BACK-WORM. See *FILANDERS*.

BACKING, in horsemanship. See *HORSEMANSHIP*.

BACKING the Sails, in navigation; to arrange them in a situation that will force the ship to retreat, or move backwards. This is, however, only done in narrow channels, when a ship is carried along sideways by the tide or current, and wants to avoid any thing that may interrupt her progress, as shoals, vessels at anchor, &c. or in the line of battle, when a ship wants to be imme-

* See *Lew.*
Pari 111.
n° 109, 113.

immediately opposite to another with which she is engaged.

BACKS, among dealers in leather, denote the thick and best-tanned hides, used chiefly for soles of shoes.

BACKS, in brewing and distilling. See **Bac**.

BACULARIUS, in writers of the middle age, an ecclesiastical apparitor, or verger; who carries a staff, *baculus*, in his hand, as an ensign of his office.

BACON, twines flesh salted, and dried in the chimney.—Old historians and law-writers speak of the *service of the bacon*, a custom in the manor of Whichenore in Staffordshire, and priory of Dunmore in Essex; in the former of which places, by an ancient grant of the lord, a sitch of bacon, with half a quarter of wheat, was to be given to every married couple who could swear, that, having been married a year and a day, they would never within that time have once exchanged their mate for any other person on earth, however richer, fairer, or the like. But they were to bring two of their neighbours to swear with them that they believed they swore the truth. On this the lord of another neighbouring manor, of Rudlow, was to find a horse saddled, and a sack to carry the bounty in, with drums and trumpets, as far as a day's journey out of the manor: all the tenants of the manor being summoned to attend, and pay service to the bacon. The bacon of Dunmore, first erected under Henry III. was on much the same footing; only the tenor of the oath was, that the parties had never once repented, or wished themselves unmarried again.

BACON (Roger), a Franciscan friar of amazing genius and learning, was born near Ilchester in Somersetshire, in the year 1214. He began his studies at Oxford; but in what school, or college, is uncertain. Thence he removed to the university of Paris, which, in those times, was esteemed the centre of literature. Here, we are told, he made so rapid a progress in the sciences, that he was esteemed the glory of that university, and was much caressed by several of his countrymen, particularly by Robert Grouthead, afterwards bishop of Lincoln, his singular friend and patron. About the year 1240, he returned to Oxford; and assuming the Franciscan habit, prosecuted his favourite study of experimental philosophy, with unremitting ardour and assiduity. In this pursuit, in experiments, instruments, and in scarce books, he tells us, he spent, in the space of 20 years, no less than L. 2000; which, it seems, was given him by some of the heads of the university, to enable him to prosecute his noble inquiries. By such extraordinary talents, and astonishing progress in sciences, which, in that ignorant age, were totally unknown to the rest of mankind, whilst they raised the admiration of the more intelligent few, could not fail to excite the envy and malice of his illiterate fraternity; who found no difficulty of possessing the vulgar with the notion of Bacon's dealing with the devil. Under this pretence, he was restrained from reading lectures; his writings were confined to his convent; and finally, in 1278, he himself was imprisoned in his cell. At this time, he was 64 years of age. Nevertheless, being permitted the use of his books, he went on in the rational pursuit of knowledge, corrected his former labours, and wrote several curious pieces. When he had been 10 years in confinement, Jerom de Ascoli being elected pope, Bacon solicited his holiness to be

released; in which, it seems, he did not immediately succeed. However, towards the latter end of that pope's reign, he obtained his liberty, and spent the remainder of his life in the college of his order, where he died in the year 1294, in the 80th year of his age, and was buried in the Franciscan church. Such are the few particulars which the most diligent researches have been able to discover concerning this very great man, who, like a single bright star in a dark hemisphere, shone forth the glory of his country, and the pride of human nature.

His works are, 1. *Epistola fratris Rogeri Baconis de secretis operibus artis et naturæ, et de nullitate magiæ*. Paris 1542, 4to. Basil, 1593, 8vo. 2. *Opus majus*. Lond. 1733, fol. published by Dr Jebb. 3. *Theaurus chemicus*. Francf. 1603, 1620. This was probably the editor's title; but it contains several of our author's treatises on this subject. These printed works of Bacon contain a considerable number of essays, which, in the catalogue of his writings by Bale, Pits, &c. have been considered as distinct books; but there remain in different libraries several manuscripts not yet published. By an attentive perusal of his works, the reader will be astonished to find, that this great luminary of the 13th century was a great linguist, and a skilful grammarian; that he was well versed in the theory and practice of perspective; that he understood the use of convex and concave glasses, and the art of making them; that the *camera obscura*, burning-glasses, and the power of the telescope, were known to him; that he was well versed in geography and astronomy; that he knew the great error in the kalendar, assigned the cause, and proposed the remedy; that he understood chronology well; that he was an adept in chemistry, and was really the inventor of gun-powder; that he possessed great knowledge in the medical art; that he was an able mathematician, logician, metaphysician, and theologist.

BACON (Sir Nicholas), lord keeper of the great seal in the reign of Queen Elizabeth, was born at Chislehurst, in Kent, in 1510, and educated at the university of Cambridge; after which he travelled into France, and made some stay at Paris. On his return, he settled in Gray's-inn, and applied himself with such assiduity to the study of the law, that he quickly distinguished himself so, that on the dissolution of the monastery of St Edmund's Bury, in Suffolk, he had a grant from king Henry VIII. in the 36th year of his reign, of several manors. In the 38th of the same king, he was promoted to the office of attorney in the court of Wards, which was a place both of honour and profit. In this office he was continued by King Edward VI; and in 1552 he was elected treasurer of Gray's-inn. His great moderation and consummate prudence preserved him through the dangerous reign of Queen Mary. In the very dawn of that of Elizabeth he was knighted; and on the 22^d of December 1558, the great seal of England, being taken from Nicholas Heath archbishop of York, was delivered to him with the title of *lord keeper*, and he was also made one of the Queen's privy council. He had a considerable share in the settling of religion: as a statesman, he was remarkable for a clear head and deep counsels: but his great parts and high preferment were far from raising him in his own opinion, as appears from the modest answer he gave Queen Elizabeth, when she told him his house at Redgrave.

grave was too little for him; "Not so, madam, (returned he), but your majesty has made me too great for my house." After having had the great seal more than 20 years, this able statesman and faithful counsellor was suddenly removed from this life, as Mr Mallet informs us, by the following accident: he was under the hands of the barber, and thinking the weather warm, had ordered a window before him to be thrown open, but fell asleep as the current of fresh air was blowing in upon him, and awaked some time after distempered all over. He was immediately removed into his bed chamber, where he died a few days after, on the 26th of February 1578-9, equally lamented by the queen and her subjects. He was buried in St Paul's, where a monument was erected to him, which was destroyed by the fire of London in 1669. Mr Granger observes, that he was the first lord keeper that ranked as lord chancellor; and that he had much of that penetrating genius, solidity, and judgment, persuasive eloquence, and comprehensive knowledge of law and equity, which afterwards shone forth with so great a lustre in his son, who was as much inferior to his father in point of prudence and integrity, as his father was to him in literary accomplishments.

BACON (Francis), lord high chancellor of England under king James I. was son of Sir Nicholas Bacon lord keeper of the great seal, in the reign of queen Elizabeth, by Anne daughter of Sir Anthony Cook, eminent for her skill in the Latin and Greek tongues. He was born 1560; and shewed such marks of genius, that he was particularly taken notice of by queen Elizabeth when very young. He was educated at Trinity college, Cambridge; and made such incredible progress in his studies, that, before he was 16, he had not only run through the whole circle of the liberal arts as they were then taught, but began to perceive those imperfections in the reigning philosophy, which he afterwards so effectually exposed, and thereby not only overturned that tyranny which prevented the progress of true knowledge, but laid the foundation of that free and useful philosophy which has since opened a way to so many glorious discoveries. On his leaving the university, his father sent him to France; where, before he was 19 years of age, he wrote a general view of the state of Europe: but Sir Nicholas dying, he was obliged suddenly to return to England; when he applied himself to the study of the common law, at Gray's-inn. At this period the famous earl of Essex, who could distinguish merit, and who passionately loved it, entered into an intimate friendship with him; zealously attempted, though without success, to procure him the office of queen's solicitor; and, in order to comfort his friend under the disappointment, conferred on him a present of land to the value of 1800*l*. Bacon, notwithstanding the friendship of so great a person; notwithstanding the number and power of his own relations; and, above all, notwithstanding the early propension of her majesty in his favour; met with many obstacles to his preferment during her reign. In particular, his enemies represented him as a speculative man, whose head was filled with philosophical notions, and therefore more likely to perplex than forward public business. It was not without great difficulty that lord treasurer Burleigh obtained for him the reversion of register to the Star-chamber, worth about

1600*l*. a year, which place fell to him about 20 years after. Neither did he obtain any other preferment all this reign; though if obedience to a sovereign in what must be the most disagreeable of all offices, viz. the calling reflections on a deceased friend, entitled him, he might have claimed it. The people were so clamorous even against the queen herself on the death of Essex, that it was thought necessary to vindicate the conduct of the administration: this was assigned to Bacon, which brought on him universal censure, nay his very life was threatened. Upon the accession of king James, he was soon raised to considerable honours; and wrote in favour of the union of the two kingdoms of Scotland and England, which the king so passionately desired. In 1616, he was sworn of the privy-council. He then applied himself to the reducing and re-composing the laws of England. He distinguished himself, when attorney-general, by his endeavours to restrain the custom of duels, then very frequent. In 1617, he was appointed lord keeper of the great seal. In 1618, he was made lord chancellor of England, and created lord Verulam. In the midst of these honours and applauses, and multiplicity of business, he forgot not his philosophy, but in 1620 published his great work intitled *Novum Organum*. We find, by several letters of his, that he thought convening of parliaments was the best expedient for the king and people. In 1621, he was advanced to the dignity of Viscount St Albans, and appeared with the greatest splendour at the opening of the session of parliament. But he was soon after surprised with a melancholy reverse of fortune. For, about the 12th of March, a committee of the house of commons was appointed to inspect the abuses of the courts of justice. The first thing they fell upon was bribery and corruption, of which the lord chancellor was accused. For that very year complaints being made to the house of commons of his lordship's having received bribes, those complaints were sent up to the house of lords, and new ones being daily made of a like nature, things soon grew too high to be got over. The king found it was impossible to save both his chancellor, who was openly accused of corruption, and Buckingham his favourite, who was secretly and therefore more dangerously attacked as the encourager of whatever was deemed most illegal and oppressive: he therefore forced the former to abandon his defence, giving him positive advice to submit himself to his peers, and promising upon his princely word to screen him in the last determination, or, if that could not be, to reward him afterwards with ample retribution of favour. The chancellor, though he foresaw his approaching ruin if he did not plead for himself, resolved to obey; and the house of peers, on the 3^d of May 1621, gave judgment against him, "That he should be fined 40,000*l*. and remain prisoner in the tower during the king's pleasure; that he should for ever be incapable of any office, place, or employment, in the state or commonwealth; and that he should never sit in parliament, or come within the verge of the court." The fault which, next to his ingratitude to Essex, thus tarnished the glory of this illustrious man, is said to have principally proceeded from his indulgence to his servants, who made a corrupt use of it. One day, during his trial, passing through a room where several of his domestics were sitting, upon their rising up to salute him,

acon,
minhup

he said, "Sit down, my masters; your rife hath been my fall." *Stephens*, p. 54. And we are told by Ruthworth in his historical collections, "That he treasured up nothing for himself or family, but was over-indulgent to his servants, and connived at their takings, and their ways betrayed him to that error; they were profuse and expensive, and had at their command whatever he was master of. The gifts taken were for the most part for interlutory orders; his decrees were generally made with so much equity, that though gifts rendered him suspected for injustice, yet never any decree made by him was reversed as unjust." It was peculiar to this great man (say the authors of the *Biogr. Brit.*) to have nothing narrow and selfish in his composition: he gave away without concern whatever he possessed; and believing other men of the same mould, he received with as little consideration. He retired, after a short imprisonment, from the engagements of an active life, to which he had been called much against his genius, to the shade of a contemplative one, which he had always loved. The king remitted his fine, and he was summoned to parliament in the first year of king Charles the first. It appears from the works composed during his retirement, that his thoughts were still free, vigorous, and noble. The last five years of his life he devoted wholly to his studies. In his recess he composed the greatest part of his English and Latin works. He expired on the 9th of April, 1626; and was buried in St Michael's church at St Albans, according to the direction of his last will, where a monument of white marble was erected to him by Sir Thomas Meautys formerly his secretary, and afterward clerk of the privy council under two kings. A complete edition of this great man's works was published at London in the year 1740.—Addison has said of him, That he had the sound, distinct, comprehensive knowledge of Aristotle, with all the beautiful light, graces, and embellishments, of Cicero.—The honourable Mr Walpole calls him the *Prophet of Arts*; which Newton was afterwards to reveal; and adds, that his genius and his works will be universally admired as long as science exists. "As long as ingratitude and adulation are despicable, so long shall we lament the depravity of this great man's heart. Alas! that he who could command immortal fame, should have stooped to the little ambition of power."

BACON (sir Nathaniel), knight of the bath, and an excellent painter, was a younger son of the lord keeper, and half brother to the great sir Francis. He travelled into Italy, and studied painting there; but his manner and colouring approaches nearer to the style of the Flemish school. Mr Walpole observes, that at Culsford, where he lived, are preserved some of his works; and at Gorbunbury, his father's seat, is a large picture by him in oil, of a cook-maid with a dead fowl, admirably painted, with great nature, neatness, and lustre of colouring. In the same house is a whole length of him, by himself, drawing on a paper, his sword and pallet hung up, and a half length of his mother by him.

BACONTHORP (John), called the *resolute doctor*, a learned monk, was born towards the end of the 13th century, at Baconthorp a village in Norfolk. He spent the early part of his life in the convent of Blackney, near Wallingham in the same county; whence he removed to Oxford, and from thence to Paris; where being

distinguished for his learning, he obtained degrees in divinity and laws, and was eleemed the principal of Averroists*. In 1329 he returned to England, and was immediately chosen twelfth provincial of the English Carmelites. In 1333 he was sent for to Rome; where, we are told, he first maintained the pope's sovereign authority in cases of divorce, but that he afterwards retracted his opinion. He died in London in the year 1346. Leland, Bale, and Pits, unanimously give him the character of a monk of genius and learning. He wrote, 1. *Commentaria seu questiones super quatuor libros sententiarum*; and, 2. *Compendium legis Christi, et quodlibeta*: both which underwent several editions at Paris, Milan, and Cremona. Leland, Bale, and Pits, mention a number of his works never published.

BACTRIA, or BACTRIANA, now *Chorassan* or *Khorasan*, an ancient kingdom of Asia, bounded on the west by Margiana, on the north by the river Oxus, on the south by Mount Paropamisus, and on the east by the Asiatic Scythia and the country of the Massagetae. It was a large, fruitful, and well-peopled country, containing according to Ammianus Marcellinus 1000 cities, though of these only a few are particularly mentioned by historians, of which that formerly called *Maracanda*, now *Samarcand*, is the most considerable.

Of the history of this country we know but little. Authors agree that it was subdued first by the Assyrians, afterwards by Cyrus, and then by Alexander the Great. Afterwards it remained subject to Seleucus Nicator and his successors till the time of Antiochus Theos; when Theodotus, from governor of that province, became king, and strengthened himself so effectually in his kingdom, while Antiochus was engaged in a war with Ptolemy Philadelphus king of Egypt, that he could never afterwards dispossess him of his acquisitions. His posterity continued to enjoy the kingdom for some time, till they were driven out by the Scythians, who reigned in Bactria in the time of Adrian, Antoninus Pius, &c. The Scythians were in their turn driven out by the Huns or Turks, and these often conquered by the Saracens and Tartars; nevertheless they continued in possession of this country in the time of Ladislaus IV. king of Hungary*.

In early times the Bactrians differed little in their manners from the Nomades; and being near neighbours of the Scythians, who were a very warlike people, the Bactrian soldiers were reckoned the best in the world. Their appearance was very savage; being of an enormous stature, having a terrible aspect, rough beards, and long hair hanging down their shoulders. Some authors assert that they kept dogs on purpose to devour such as arrived at extreme old age, or who were exhausted by long sickness. They add, that for all their fierceness, the Bactrian husbands were such dupes to their wives, that they durst not complain of them even for conjugal infidelity, to which it seems the latter were very much addicted.

BACTROPERATA, an ancient appellation given to philoplayers by way of contempt, denoting a man with a staff and a budget.

We suppose it is of the same people that Pauchasius Radbertus speaks under the corrupt name of *Bacoperitas*, or *Bacchionites*, whom he describes as philoplayers who had so great a contempt for all earthly things, that they kept nothing but a dish to drink out of; and

Bactria
||
Bactro-
perata.
* See Auer-
19. 2.

* See Kib-
rajan.

that one of this order seeing a peasant scooping up the water in his hand, threw away his cup as a superfluity: which is nothing but the old story of Diogenes the Cynic.

BACULE, in fortification, a kind of portcullis, or gate, made like a pit-fall with a counterpoise, and supported by two great flakes. It is usually made before the corpa-de-guard, not far from the gate of a place.

BACULOMETRY, the art of measuring accessible or inaccessible heights, by the help of one or more baculi, flaves, or rods. See **GEOMETRY**.

BACURIUS, or **BATURUS**, king of the Iberians, a people on the side of the Caspian sea. One day being a-hunting, he lost sight of his company, through a great storm and sudden darkness; upon which he vowed to the God of his Christian slave, that if he were delivered he would worship him alone: the day breaking up immediately, he made good his promise, and became the apostle of his country.

BADAGSHAN, a very ancient city of Great Bukharia, in the province of Balkh, situated at the foot of those high mountains which separate Indostan from Great Tartary. The city is exceedingly strong by its situation; and belongs to the khan of proper Bukharia, who uses it as a kind of state-prison to secure those he is jealous of. The town is not very big, but well built, and very populous. It stands on the north side of the river Amu, about 100 miles from its source, and is a great thoroughfare for the caravans designed for little Bukharia. The inhabitants are enriched by mines of gold, silver, and rubies, which are in the neighbourhood; and those who live at the foot of the mountains gather a great quantity of gold and silver dust brought down in the spring by torrents occasioned by the melting of the snow on the top.

BADAJOS, a large and strong town, capital of Estremadura in Spain. It is seated on the river Guadiana, over which there is a fine bridge built by the Romans. On this bridge the Portuguese were defeated in 1661, by Don John of Austria. W. Long. 7. 3. N. Lat. 38. 35.

BADELONA, a town of Catalonia in Spain, seated on the Mediterranean. Lord Peterborough landed here in 1704, when, with Charles then king of Spain, he laid siege to Barcelona, from which it is ten miles distant. E. Long. 2. 20. N. Lat. 41. 12.

BADEN (the district of), in Switzerland, has three cities, Baden, Keisers-Stoul, and Klingnaw, besides a town that passes for a city, namely, *Zurzach*. It is one of the finest countries in Switzerland, and is watered with three navigable rivers, the Limmet, Rufs, and Arê. The land is fertile in corn and fruit, and there are places on the sides of the Limmet which produce wine. It maintains a communication between the cantons of Zurich and Bern, being seated between their north extremities. It extends on one side to the Arê, as far as the place where it falls into the Rhine, and on the other side beyond the Rhine, where there are some villages which depend thereon. Most of the inhabitants are Papists. By the treaty of peace at the conclusion of the war which broke out in 1712 between the Protestant and Popish cantons, this country was yielded to the Protestant cantons of Zurich and Bern. Before, it was the property of the eight old cantons; however, as the canton of Glaris had taken no part in

this war, by the consent of both parties its right was still continued.

BADEN, the capital of the above district, is an agreeable city, moderately large, seated on the side of the Limmet, in a plain flanked by two high hills, between which the river runs. This city owes its rise to its baths, which were famous before the Christian era. Several monuments of antiquity have been found here from time to time, particularly in 1420. When they were opening the large spring of the baths, they found statues of several heathen gods, made of alabaster; Roman coins, made of bronze, of Augustus, Vespasian, Decius, &c.; and several medals of the Roman emperors, of gold, silver, copper, and bronze. There are two churches in Baden; one of which is collegiate, and makes a good appearance; the other is a monastery of the Capuchins, near the town-house. This last building serves not only for the assemblies of their own council, but also for those of the cantons. The diet assemblies there in a handsome room made for that purpose; the deputies of Zurich sit at the bottom behind a table, as the most honourable place; the ambassadors of foreign powers are seated on one side to the right, and the deputies of the other cantons are ranged on each side the room. The bailiff of Baden resides in a castle at the end of a handsome wooden bridge, which is covered in. Before this castle there is a stone pillar, erected in honour of the emperor Trajan, who paved a road in this country 85 Italian miles in length. The inhabitants are rigid Roman-catholics, and formerly behaved in a most insolent manner to the Protestants, but they are now obliged by their masters to be more submissive. The baths which are on each side the river are a quarter of a league from the city. Joining to the small baths there is a village, and to the large a town which may pass for a second Baden. It is seated on a hill, whose ascent is steep. There the baths are brought into inns and private houses, by means of pipes, which are about 60 in all. There are also public baths in the middle of the town, from a spring which rises in the street, where the poor bathe gratis, but they are exposed quite naked to all that pass by. All the baths are hot, and one to so great a degree as to scald the hand; and they are impregnated with a great deal of sulphur, with some allum and nitre. They are useful for drinking as well as bathing; and are said to cure all diseases from a cold cause, head-achs, vertigos, &c. They strengthen the senses, cure diseases of the breast and bowels, asthma, and obstructions. They are peculiarly excellent for womens diseases. E. Long. 8. 25. N. Lat. 47. 27.

BADEN (the Margrave of), in the circle of Swabia, in Germany, is bounded by the Palatinate of the Rhine, on the north; by the Black Forest, on the east; by Switzerland, on the south; and by the Rhine, which divides it from Alsace, on the east: and is about 90 miles in length, from north to south; but not above 20 in breadth, where it is widest. It is a very populous and fruitful country, abounding in corn and wine. Venison and wild fowl are so plentiful, that they are the common diet of the peasants. The rivers that water this territory, are the Rhine, Ens, Wirmbs, and Plints, which yield plenty of fish. They feed their hogs with chefnuts, which make the bacon excellent. They have free-stone for building, and marble of all colours. They have

have some agate, and great quantities of hemp and flax for exportation. The chief towns are Baden, Durlach, Stollhafen, Raftadt, Gersbach, Pforrheim, and Hochberg.

BADEN, the chief city of the above margravate, has a castle that stands on the top of a hill, which is the residence of a prince. The town is seated among hills, on rocky and uneven ground, which renders the streets inconvenient and crooked. It is famous for its baths, the springs of which are said to be above 300. Some of them are hot, and accounted to be very good in nervous cafes. They partake of salt, allum, and sulphur. E. Long. 9. 24. N. Lat. 48. 50.

BADEN, a town of Germany, in the arch-duchy of Austria, seated on the Little Suechat, is a neat little walled town, standing in a plain not far from a ridge of hills which run out from the mountain Cetius. It is much frequented by the people of Vienna, and the neighbouring parts, on account of its baths. The springs supply two convenient baths within the town, five without the walls, and one beyond the river. They are good for distempers of the head, the gout, dropsy, and most chronic distempers. It is observable that all these Badens take their names from the baths. E. Long. 17. 10. N. Lat. 48. 0.

BADENOCH, the most northerly part of Inverness-shire, in Scotland, extending about 33 miles in length from east to west, and 27 from north-east to south-west where broadest. It has no considerable town, and is very barren and hilly, but abounds with deer, and other kinds of game.

BADEN-WEILLER, a town of Germany, belonging to the lower Margravate of Baden. E. Long. 7. 50. N. Lat. 47. 55.

BADGER, in zoology, the English name of a species of *ursus*. See *URSUS*.

BADGER, in old law-books, one that was licensed to buy corn in one place, and carry it to another to sell, without incurring the punishment of an engrosser.

BADIA, an ancient town of Bætica on the Anas; now supposed to be *Badajoz* on the Guadiana *.

BADIANE, or *BANDIAN*, the seed of a tree which grows in China, and smells like anise-feed. The Chinese, and the Dutch in imitation of them, sometimes use the *badiane* to give their tea an aromatic taste.

BADIS, a fortress of Livonia, subject to Russia. E. Long. 23. 10. N. Lat. 59. 15.

BADIUS (Conrad), and (Stephen Robert), his brother; French refugees; celebrated as printers at Geneva, and Conrad as an author. The latter died in 1566.

BÆTERRÆ, an ancient town of the Tertolages in Gallia Narbonensis; now *Befers*, on the east bank of the Obriis, now *Orbis*, or *Orbe*, in Lower Languedoc *.

BÆTICA, a province of ancient Spain, so called from the famed river Bætis, afterwards *Tartessus*, now *Guadalquivir*, or the great river. It was bounded on the west by Lusitania; on the south, by the Mediterranean, and *Sinus Gaditanus*; on the north, by the Cantabric sea, now the Bay of Biscay. On the east and north-east, its limits cannot be so well ascertained, as they are very reasonably thought to have been in a continual state of fluctuation, as each petty monarch had an opportunity of encroaching upon his neighbour. The province was divided in two by the river Bætis already mentioned. On the one side of which, towards

the Anas, were situated the Turdetani, from whence the kingdom was called *Turdetania*, though more generally known by the name of *Bæturia*. On the other side were situated the Bæstuli, Bæstetani, and Costetani, along the Mediterranean coasts. The Bæstuli were supposed to be of Phœnician extract, and dwelt along the coasts of the Mediterranean, till, driven from thence by the Moors, they fled into the mountainous parts of Galicia, which they then called from their own name *Bæstulia*. The Bæstetani were seated higher up, on the same coasts. The territories of both these made part of what has since become the kingdom of *Granada*; in which there is a ridge of very high mountains called from the abovementioned people, the *Bæstetanian mountains*. Mention is also made of their capital *Bæstetana*; a place of such strength, that King Ferdinand was six months besieging it before he could take it from the Moors.—The whole province of Bætica, according to the most probable account, contained what is now called *Andalusia*, part of the kingdom of Grenada, and the outward boundaries of *Estremadura*.

BÆTIS. See *BÆTICA*.

BETULO, a town of ancient Spain, in the *Terraconensis*; now *Badelona* in Catalonia *.

BÆTYLIA, anointed stones, worshipped by the Phœnicians, by the Greeks before the time of Cæcrops, and by other barbarous nations. They were commonly of a black colour, and consecrated to some god, as Saturn, Jupiter, the Sun, &c.—Some are of opinion that the true original of these idols is to be derived from the pillar of stone which Jacob erected at Bethel, and which was afterwards worshipped by the Jews.

These *betylia* were much the object of the veneration of the ancient heathens. Many of their idols were no other. In reality, no sort of idol was more common in the eastern countries, than that of oblong stones erected, and hence termed by the Greeks, *xoivis, pillars*. In some parts of Egypt they were planted on both sides of the highways. In the temple of Heliogabalus, in Syria, there was one pretended to have fallen from heaven. There was also a famous black stone in Phrygia, said to have fallen from heaven. The Romans sent for it and the priests belonging to it with much ceremony, Scipio Natica being at the head of the embassy.

BEZA, a city of Andalusia in Spain, seated on a high hill, three miles from the Guadalquivir; it is the see of a bishop, and has a kind of university founded by John D' Avila. It was taken from the Moors about the end of the 15th century. E. Long. 3. 15. N. Lat. 37. 45.

BÆFFETAS, or *BASTAS*, a cloth made of coarse white cotton-thread, which comes from the East Indies. That of Surat is the best.

BAFFIN'S BAY, a gulph of North America, running north east from Cape Farewell in West Greenland, from 60° to 80° of north latitude.

BAFFO, a considerable town in the island of Cyprus, with a fort built near ancient Paphos, of which some considerable ruins yet remain, particularly some broken columns, which probably belonged to the temple of Venus. E. Long. 32. 20. N. Lat. 34. 50.

BAG, in commerce, a term signifying a certain quantity of some particular commodity: a bag of almonds,

Bætis
||
Bag.

* See *Badelona*.

Eag
Bagdad.

monds, for instance, is about 300 weight; of aniseeds, from 300 to 400, &c.

Bags are used in most countries to put several sorts of coin in, either of gold, silver, brass, or copper. Bankers, and others, who deal much in current cash, label their bags of money, by tying a ticket or note at the mouth of the bag, signifying the coin therein contained, the sum total, its weight, and of whom it was received. Tare is allowed for the bag.

BAG, among farriers, is when, in order to retrieve a horse's lost appetite, they put in an ounce of asa-fœtida, and as much powder of safin, into a bag, to be tied to the bit, keeping him bridled for two hours, several times a-day; as soon as the bag is taken off, he will fall to eating. The same bag will serve a long time.

BAGAMADER, or BAGAMEDRI, a province of the kingdom of Abyssinia in Africa. It is said to receive its name from the great number of sheep bred in it; *meder* signifying land or earth, and *bag* a sheep. Its length is estimated about 60 leagues, and its breadth 20: but formerly it was much more extensive; several of its provinces having been dismembered from it, and joined to that of Tigre. A great part of it, especially towards the east, is inhabited by wandering Gallas and Caffres.

BAGDAD, a celebrated city of Asia in Irak Arabi, seated on the eastern banks of the Tigris, in E. Long. 43. 40. N. Lat. 33. 15. By many authors this city is very improperly called *Babylon*. The latter stood on the Euphrates at a considerable distance.

This city, for many years the capital of the Saracen empire, was founded by the khalif Al Mansur, the second of the house of Al Abbas, after an attempt by the Rawandians to assassinate him, as already mentioned *.

The reasons assigned by the Arabian historians for building the city of Bagdad are, That the above-mentioned attempt to assassinate the khalif had disgusted him at his Arabian subjects in general, and that the spot where Bagdad stood was at a considerable distance from the city of Cufa particularly; the inhabitants of which were remarkable for their treachery and inconsistency, of which Al Mansur himself had felt several instances. Besides, the people of Irak, who had always continued faithful to him, represented, that by building his capital near the confluence of the Euphrates and Tigris, it would be in a great measure secured from the insults and attacks of those who should have an inclination to dispute the khalifat with him; and that by being situated as it were in the middle of the tract comprehending the districts of Basrah, Cufa, Wafet, Mawfel, and Swada, at no great distance from those cities, it would be plentifully supplied with provisions by means of the aforesaid rivers.

Concerning the origin of the name *Bagdad*, there are various accounts, which, being equally uncertain and trifling, merit no attention. The first city that went by this name was situated on the western bank of the Tigris; from whence Al Mansur dispatched his son Al Mohdi with a body of Moslem troops, to the opposite bank. Here the young prince took post, and fortified the place on which he had encamped with a wall, in order to cover his troops, as well as the workmen employed by his father on the other side of the river, from the incursions of the Persians, who seemed

to have taken umbrage at the erection of a new metropolis so near the frontiers of their dominions. Hence that part of the city soon afterwards built on the eastern banks of the Tigris, received the name of the *Camp*, or *Fortress*, of *Al Mohdi*. The khalif had a superb and magnificent palace both in the eastern and western part of the town. The eastern palace was surrounded on the land-side by a femicircular wall that had six gates; the principal of which seems to have been called the *gate of prefects*, whose entrance was generally killed by the princes and ambassadors that came to the khalif's court. The western part of the city was entirely round, with the khalif's palace in the centre, and having the great mosque annexed to it. The eastern part consisted of an interior and exterior town, each of which was surrounded by a wall. For some time the building of the city went but slowly on, owing to a scarcity of materials for building; for which reason the khalif was sometimes inclined to remove the materials of Al Madayen the ancient metropolis of the Persian empire. But, upon trial, he found the stones to be of such an immense size, that the removal of them to Bagdad would be attended with great difficulty and expence; besides, he considered that it would be a reflection upon himself to have it said that he could not finish his metropolis without destroying such a pile of building as perhaps could not be paralleled in the whole world; for which reasons he at length gave over his design, and erected the city of Bagdad, most probably, out of the ruins of the ancient cities of Seleucia and Ctesiphon, putting an end to his undertaking in the 149th year of the Hegira, or four years after the city was begun.

From the building the city of Bagdad, to the death of Al Mansur, nothing very remarkable happened, excepting some irruptions made into the territories of the Greeks, and by the Arabs into some of the khalif's other territories. In the 157th year of the Hegira also, a grievous famine was felt in Mesopotamia, which was quickly after followed by a plague that destroyed great numbers. This year likewise, the Christians, who had been all along very severely dealt with by Al Mansur, were treated with the utmost rigour by Musa Ebn Mofaab the khalif's governor; every one who was unable to pay the enormous tribute exacted of them being thrown into prison without distinction.

The next year, being the 158th of the Hegira, the khalif set out from Bagdad, in order to perform the pilgrimage to Mecca: but being taken ill on the road, he expired at Bir Maimun, whence his body was carried to Mecca; where, after 100 graves had been dug, that his sepulchre might be concealed, he was interred, having lived, according to some 63, according to others 68 years, and reigned 22. He is said to have been extremely covetous, and to have left in his treasury 600,000,000 dirhems, and 24,000,000 dinars. He is reported to have paid his cook by assigning him the heads and legs of the animals dressed in his kitchen, and to have obliged him to procure at his own expence all the fuel and vessels he had occasion for.

When Al Mansur expired at Bir Maimun, he had only his domestics and Rabi his freedman with him. The latter of these, for some time, kept his death concealed, and pretended to have a conference with him; in which, as he gave out, the khalif commanded him

to

* See *Ara-*
bia, no 184.

Why the
city was
built.

2
Ancient
city de-
scribed.

3
Death of
Al Mansur.

4
Succeeded
by Al
Mohdi.

to exact an oath of allegiance to Al Mohdi his son, as his immediate successor, and to Isa Ebn Musa his cousin-german, as the next apparent heir to the crown. He then dispatched a courier to Bagdad with the news of Al Mansur's death; upon which Al Mohdi was unanimously proclaimed khalif. Isa Ebn Musa, however, no sooner heard this news, than he began to entertain thoughts of setting up for himself at Cufa where he then resided; and in order to facilitate the execution of his scheme, fortified himself in that city. But Al Mohdi, being apprized of his defection, sent a detachment of 1000 horse to bring him to Bagdad; which being done, Al Mohdi not only prevailed upon him to own his allegiance to him, but also to give up his right to the succession for 10,000 according to some, or according to others for 10,000,000, dinars.

From the accession of Al Mohdi, to the 164th year of the Hegira, the most remarkable event was the rebellion of Al Mokanna. This impostor, whose true name was Hakem Ebn Helham, came originally from Khorasan, and had been an under secretary to Abu Moslem governor of that province. He afterwards turned soldier, and passed thence into Mawar-nahr, where he gave himself out for a prophet. The name of Al Mokanna, as also that of Al Borkai, that is, the *veiled*, he took from his custom of covering his face with a veil or girdle mask, to conceal his deformity; he having lost an eye in the wars, and being otherwise of a despicable appearance; though his followers pretended he did this for the same reason that Moses did, viz. lest the splendor of his countenance should dazzle the eyes of his beholders. In some places he made a great many proselytes, deluding the people with a number of juggling tricks which they swallowed as miracles, and particularly by causing the appearance of a moon to rise out of a well for many nights together; whence he was also called, in the Persian tongue, *Sazendeh mak*, or the *moon-maker*. This wretch, not content with being reckoned a prophet, arrogated to himself divine honours; pretending that the Deity resided in his person, having proceeded to him from Abu Moslem, in whom he had taken up his residence before. At last this impostor raised an open rebellion against the khalif, and made himself master of several fortified places in Khorasan, so that Al Mohdi was obliged to send one of his generals with an army against him. Upon the approach of the khalif's troops, Al Mokanna retired into one of his strong fortresses which he had well provided for a siege; and sent his emissaries abroad to persuade the people that he raised the dead to life, and foretold future events. But being closely beseged by the khalif's forces, and seeing no possibility of escaping, he gave poison in wine to his whole family and all that were with him in the castle; when they were dead, he burnt their bodies, together with all their furniture, provisions, and cattle; and lastly he threw himself into the flames, or, as others say, into a tub of aqua fortis, or some other preparation, which consumed every part of him except the hair. When the besiegers therefore entered the place, they found no living creature in it, except one of Al Mokanna's concubines, who, suspecting his design, had hid herself, and now discovered the whole matter. This terrible contrivance, however, failed not to produce the desired effect. He had promised his

followers, that his soul should transmigrate into the form of an old man riding on a greyish coloured beast, and that after for many years he would return and give them the earth for their possession; which ridiculous expectation kept the sect in being for several years.

All this time war had been carried on with the Greeks, but without any remarkable success on either side. In the 164th year of the Hegira, however, Al Mohdi ordered his son Harun Alrafschid to penetrate into the Greek territories with an army of 95,000 men. Harun, then, having entered the dominions of the empress Irene, defeated one of her commanders that advanced against him; after which he laid waste several of the imperial provinces with fire and sword, and even threatened the city of Constantinople itself. By this the empress was so terrified, that she purchased a peace with the khalif by paying him an annual tribute of 70,000 pieces of gold; which, for the present at least, delivered her from the depredations of these barbarians. After the signing of the treaty, Harun returned home laden with spoils and glory. This year, according to some of the oriental historians, the sun one day, a little after his rising, totally lost his light in a moment, without being eclipsed, when neither any fog nor any cloud of dust appeared to obscure him. This frightful darkness continued till noon, to the great astonishment of the people settled in the countries where it happened.*

In the 169th year of the Hegira, Al Mohdi was poisoned, tho' undesignedly, by one of his concubines named *Hafsanah*. She had designed to destroy Al Mohdi one of her rivals whom she imagined to have too great an ascendant over the khalif, by giving her a poisoned pear. This the latter, not suspecting any thing, gave to the khalif; who had no sooner eaten it than he felt himself in exquisite torture, and soon after expired.

On the death of Al Mohdi, he was succeeded by his eldest son Al Hadi; who having formed a design to deprive his younger brother Harun Alrafschid of his right of succession, and even to assassinate him, was poisoned by his vizier in the 170th year of the Hegira; and on his death, the celebrated khalif Harun Alrafschid ascended the throne.

This was one of the best and wisest princes that ever sat on the throne of Bagdad. He was also extremely fortunate in all his undertakings, tho' he did not much extend his dominions by conquest. In his time the Moslem empire may be said to have been in its most flourishing state, though, by the independency of the Moslems in Spain, who had formerly set up a khalif of the house of Ommyiah, his territories were not quite so extensive as those of some of his predecessors. He possessed the provinces of Syria, Palestine, Arabia, Persia, Armenia, Natolia, Media or *Aderbijan*, Babylonia, Assyria, Sindhia, Sijistan, Khorasan, Taberistan, Jorjan, Zablestan or *Sabkistan*, Mawaralnahr or *Great Bukharia*, Egypt, Libya, Mauritania, &c.; so that his empire was by far the most powerful of any in the world, and extended farther than the Roman empire ever had done.

The first instance of Harun's good fortune, and which was taken for a presage of a prosperous and happy reign, was his finding a valuable ring which he had thrown into the Tigris to avoid being deprived of it by his brother Al Hadi. He was able to give the

legend.

7
Harun Al-
rafschid's suc-
cess against
the Greeks.

8
Unaccount-
able dark-
ness.

* See *Astro-
nomy*, no 12
and 286.

9
Al Mohdi
poisoned.

10
As likewise
his successor
Al Hadi.

11
Harun Al
Rafschid kha-
lif.

12
Extent of
his empire.

13
He finds a
ring he had
thrown into
the Tigris.

Bagdad.

divers no other direction than by throwing a stone from the bridge of Bagdad, about the same place of the river in which he had thrown the ring; notwithstanding which, they found it without any great difficulty.

14
Divides the empire among his sons, and settles the succession.

In the 186th year of the Hegira, beginning January 10th, 802, the khalif divided the government of his extensive dominions among his three sons in the following manner: To Al Amin the eldest, he assigned the provinces of Syria, Irak, the three Arabias, Mesopotamia, Assyria, Media, Palestine, Egypt, and all that part of Africa extending from the confines of Egypt and Ethiopia to the straits of Gibraltar, with the dignity of khalif; to Al Mamun the second, he assigned Persia, Kerman, the Indies, Khorasan, Taberistan, Cabelistan and Zablestan, together with the vast province of Mawaralnahr; and to his third son Al Kafem, he gave Armenia, Natolia, Jorjan, Georgia, Circassia, and all the Moslem territories bordering upon the Euxine sea. As to the order of succession, Al Amin was to ascend the throne immediately after his father's decease; after him, Al Mamun; and then Al Kafem, whom he had surnamed *Al Mutaman*.

15
His successful wars with the Greeks.

The most considerable exploits performed by this khalif were against the Greeks, who by their perfidy provoked him to make war upon them, and whom he always overcame. In the 187th year of the Hegira, the khalif received a letter from the Greek emperor Nicephorus soon after he had been advanced to the imperial dignity, commanding him to return all the money he had extorted from the empress Irene, though that had been secured to him by the last treaty concluded with that prince, or expect soon to see an imperial army in the heart of his territories. This insolent letter so exasperated Harun, that he immediately assembled his forces and advanced to Heraclea, laying the country through which he passed waste with fire and sword. For some time also he kept that city strictly besieged; which so terrified the Greek emperor, that he submitted to pay an annual tribute. Upon this, Harun granted him a peace, and returned with his army. But a hard frost soon after happening in these parts, Nicephorus took for granted that Al Rashid would not pay him another visit, and therefore broke the treaty he had concluded. Of this the khalif receiving advice, he instantly put himself in motion; and, notwithstanding the inclemency of the weather, forced the emperor to accept of the terms proposed. According to a Persian historian, before the hostilities at this time commenced, Nicephorus made the khalif a present of several fine swords, giving him thereby plainly to understand that he was more inclinable to come to blows than to make peace with him. All these swords Harun cut asunder with his famous sword *Samsjah*, as if they had been so many radishes, after which severe proof there did not appear the least flaw in the blade; a clear proof of the goodness of the sword, as the cutting the others with it was of the strength of Harun's arm. This sword had fallen into Al Rashid's hands among the spoils of Ebn Dakikan, one of the last Hamyaritic princes of Yaman; but is said to have belonged originally to a valiant Arab named *Amru Ebn Maadi Carh*, by whose name it generally went among the Moslems. This man is said to have performed very extraordinary feats with his sword, which induced a certain prince to

borrow it from him; but he not being able to perform any thing remarkable with it, complained to Amru that it had not the desired effect; upon which that brave man took the liberty to tell him, that he had not sent him his arm along with his sword.

In the 188th year of the Hegira, war was renewed with the Greeks, and Nicephorus with a great army attacked the khalif's forces with the utmost fury. He was, however, defeated with the loss of 40,000 men, and received three wounds in the action; after which the Moslems committed terrible ravages in his territories, and returned home laden with spoils. The next year Harun invaded Phrygia; defeated an imperial army sent to oppose him; and having ravaged the country, returned without any considerable loss. In the 190th year of the Hegira, commencing November 27th 805, the khalif marched into the Imperial territories with an army of 135,000 men, besides a great number of volunteers and others who were not enrolled among his troops. He first took the city of Heraclea, from whence he is said to have carried 16,000 prisoners; after which he made himself master of several other places; and, in the conclusion of the expedition, he made a descent on the island of Cyprus, which he plundered in a terrible manner. This success so intimidated Nicephorus, that he immediately sent the tribute due to Harun, the withholding of which had been the cause of the war; and concluded a peace upon the khalif's own terms; one of which was, that the city of Heraclea should never be rebuilt. This perhaps Harun would not have so readily granted, had not one Rafe Ebn Al Leith revolted against him at Samarcand, and assembled a considerable force to support him in his defection.

The next year, being the 191st of the Hegira, the khalif removed the governor of Khorasan from his employment, because he had not been sufficiently attentive to the motions of the rebel Rafe Ebn Al Leith. As this governor had also tyrannized over his subjects in the most cruel manner, his successor no sooner arrived than he sent him in chains to the khalif; but notwithstanding all Harun's care, the rebels made this year a great progress in the conquest of Khorasan.

Next year, the khalif found it necessary to march in person against the rebels, who were daily becoming more formidable. The general rendezvous of his troops was in the plains of Rakka, from whence he advanced at the head of them to Bagdad. Having at that place supplied the troops with every thing necessary, he continued his march to the frontiers of Jorjan, where he was seized with an illness which grew more violent after he had entered that province. Finding himself therefore unable to pursue his journey, he resigned the command of the army to his son Al Mamun, retiring himself to Tus in Khorasan. We are told by Khondemir, that, before the khalif departed from Rakka, he had a dream wherein he saw a hand over his head, full of red earth, and at the same time heard a person pronouncing these words, "See the earth where Harun is to be buried." Upon this he demanded where he was to be buried; and was instantly answered, "At Tus." This dream greatly discomposing him, he communicated it to his chief physician, who endeavoured to divert him, telling the khalif that the dream had been occasioned by the thoughts of his expedition against the rebels.

He

Bagdad.

16
Rebellion in Khorezmi.

17
The khalif's death predicted by a dream.

He therefore advised him to pursue some favourite diversion that might draw his attention another way. The khalif accordingly, by his physician's advice, prepared a magnificent regale for his courtiers, which lasted several days. After this, he put himself at the head of his forces, and advanced to the confines of Jorjan, where he was attacked by the distemper that proved fatal to him. As his disorder increased, he found himself obliged to retire to Tus; where being arrived, he sent for his physician, and said to him, "Gabriel, do you remember my dream at Rakka? we are now arrived at Tus, the place, according to what was predicted in that dream, of my interment. Send one of my eunuchs to fetch me a handful of earth in the neighbourhood of this city." Upon this, *Masfur*, one of his favourite eunuchs, was dispatched to bring a little of the soil of the place to the khalif. He soon returned, and brought a handful of red earth, which he presented to the khalif with his arm half bare. At the sight of this, Harun instantly cried out, "In truth this is the earth, and this is the very arm, that I saw in my dream." His spirits immediately failing, and his malady being greatly increased by the perturbation of mind ensuing upon this sight, he died three days after, and was buried in the same place. According to *Abul Faraj*, *Basbir Ebn Al Leith* the arch-rebel's brother was brought in chains to the khalif, who was then at the point of death. At the sight of whom Harun declared, that if he could speak only two words he would say *kill him*; and immediately ordered him to be cut to pieces in his presence. This being done, the khalif soon after expired, in the year of the Hegira 193, having reigned 23 years. The distemper that put an end to his days is said to have been the bloody flux.

Upon the arrival of a courier from Tus, with the news of *Al Rashid*'s death, his son *Al Amin* was immediately proclaimed khalif; and was no sooner seated on the throne, than he formed a design of excluding his brother *Al Mamun* from the succession. Accordingly he deprived him of the furniture of the imperial palace of Khorasan; and in open violation of his father's will, who had bestowed on *Al Mamun* the perpetual government of Khorasan, and of all the troops in that province, he ordered these forces to march directly to Bagdad. Upon the arrival of this order, *Al Mamun* expostulated with the general *Al Fadl Ebn Rabi* who commanded his troops, and endeavoured to prevent his marching to Bagdad; but without effect, for he punctually obeyed the orders sent by the khalif. *Al Mamun*, however, took care not to be wanting in fidelity to his brother. He obliged the people of Khorasan to take an oath of fidelity to *Al Amin*, and reduced some who had actually excited a considerable body of the people to revolt, while the general *Al Fadl* having ingratiated himself with the khalif by his ready compliance with his orders, was chosen prime vizir, and governed with an absolute sway; *Al Amin* abandoning himself entirely to drunkenness.

Al Fadl was a very able minister; though, fearing *Al Mamun*'s resentment if ever he should ascend the throne, he gave *Al Amin* such advice as proved in the end the ruin of them both. He told him that his brother had gained the affection of the people of Khorasan by the good order and police he had established among them; that his unwearied application to the administration of

justice had so attracted their esteem, that the whole province was entirely at his devotion; that his own conduct was by no means relished by his subjects, whose minds were almost totally alienated from him; and, therefore, that he had but one part to act, which was to deprive *Al Mamun* of the right of succession that had been given him by his father, and transfer it to his own son *Musa*, though then but an infant. Agreeable to this pernicious advice, the khalif sent for his brother *Al Kafem* from Mesopotamia, and recalled *Al Mamun* from Khorasan, pretending he had occasion for him as an assistant in his councils.

By this treatment *Al Mamun* was so much provoked, that he resolved to come to an open rupture with his brother, in order if possible to frustrate his wicked designs. Instead, therefore, of going to Bagdad as he had been commanded, he cut off all communication between his own province and that capital; pretending, that as his father Harun had assigned him the lieutenantancy of Khorasan, he was responsible for all the disorders that might happen there during his absence. He also coined money, and would not suffer *Al Amin*'s name to be impressed upon any of the dirhems or dinars struck in that province. Not content with this, he prevailed upon *Rafe' Ebn Al Leith*, who had been for some time in rebellion, to join him with a body of troops; whose example was soon after followed by *Harthema Ebn Aafan*; which put him in possession of all the vast territory of Khorasan. Here he governed with an absolute sway, officiated in the mosque as *Inam*, and from the pulpit constantly harangued the people.

The following year, being the 195th year of the Hegira, beginning October 4th 810, the khalif *Al Amin*, finding that his brother set him at defiance, declared war against him, and sent his general *Al Ebn Isha* with an army of 60,000 men to invade Khorasan. *Al Mamun*, being informed that *Ali* was advancing against him with such a powerful army, put on foot all the troops he could raise, and gave the command to *Thaher Ebn Hofein*, one of the greatest generals of his age. *Thaher* being a man of undaunted resolution, chose only 4000 men, whom he led against *Al Amin*'s army. *Ali*, seeing so small a number of troops advancing against him, was transported with joy, and promised himself an easy victory. Despising his enemies, therefore, he behaved in a secure and careless manner; the consequence of which was, that his army was entirely defeated, and himself killed, his head being afterwards sent as a present to *Al Mamun*, who amply rewarded *Thaher* and *Harthema* for their services.

After this victory, *Al Mamun* assumed the title of khalif; ordered *Al Amin*'s name to be omitted in the public prayers, and made all necessary preparations for carrying the war into the very heart of his brother's dominions. For this purpose he divided his forces into two bodies, and commanded them to march into Irak by different routes. One of them obeyed the orders of *Thaher*, and the other of *Harthema*. The first directed his march towards Ahwaz, and the other towards Holwan, both of them proposing to meet in the neighbourhood of Bagdad, and after their junction to besiege that city.

In the 196th year of the Hegira, *Thaher Ebn Hofein* made a most rapid progress with the troops under his command. Having advanced towards Ahwaz, there

Bagdad.

21
Al Mamun
 takes up
 arms against
 his brother.

22
Al Amin's
 forces de-
 feated.

23
Al Ma-
mun's rapid
 conquests.

Bagdad.

there defeated a body of the khalif's forces; and though the victory was by no means decisive, it so intimidated the commander of Ahwaz, that he thought fit to surrender that fortress to him. This opened him a way to Waset upon the Tigris, and facilitated the conquest of that place. After this he marched with his army to Al Madayen; the inhabitants of which immediately opened their gates to him. The rapidity of these conquests, and the infamous conduct of Al Amin, excited the people of Egypt, Syria, Hejaz, and Yaman, unanimously to declare for Al Mamun; who was accordingly proclaimed khalif in all these provinces.

24
Siege of
Bagdad.

The next year, Al Mamun's forces under Thaher and Harthema, laid siege to Bagdad. As the khalif was shut up in that place, and it had a numerous garrison, the besieged made a vigorous defence, and destroyed a great number of their enemies. The besiegers, however, incessantly played upon the town with their catapults and other engines, though they were in their turn not a little annoyed by the garrison with the same sort of military machines. The latter likewise made continual sallies, and fought like men in despair, tho' they were always at last beaten back into the town with considerable loss. In short, the siege continued during the whole of this year, in which the greatest part of the eastern city, called the *Camp of Al Mohdi*, was demolished or reduced to ashes. The citizens, as well as the garrison, were reduced to the last extremity by the length and violence of the siege.

In the beginning of the 108th year of the Hegira, Al Amin finding himself deserted by his troops, as well as by the principal men of Bagdad, who had kept a private correspondence with Thaher, was obliged to retire to the old town on the west bank of the Tigris. He did not, however, take this step, before the inhabitants of the new town had formally deposed him, and proclaimed his brother Al Mamun khalif. Thaher, receiving advice of this, caused the old town to be immediately invested, planted his engines against it, and at last starved it to a surrender. Al Amin being thus reduced to the necessity of putting himself into the hands of one of the generals, chose to implore the protection of Harthema, whom he judged to be of a more humane disposition than Thaher. Having obtained this, he embarked in a small vessel in order to arrive at that part of the camp where Harthema was posted; but Thaher being informed of his design, which, if put in execution, he thought would eclipse the glory he had acquired, laid an ambush for him, which he had not the good fortune to escape. Upon his arrival in the neighbourhood of Harthema's tent, Thaher's soldiers rushed upon him, drowned all his attendants, and put himself in prison. Here he was soon after massacred by Thaher's servants, who carried his head in triumph to their master, by whose order it was afterwards exposed to public view in the streets of Bagdad. Thaher afterwards sent it to Al Mamun in Khorasan, together with the ring or seal of the khalifat, the sceptre, and the imperial robe. At the sight of these, Al Mamun fell down on his knees, and returned thanks to God for his success; making the courier who brought them a present of a million of dirhems, in value about L. 100,000 Sterling.

25
Al Amin
murdered.

26
Succeeded
by Al Ma-
mun.

The same day that Al Amin was assassinated, his brother Al Mamun was proclaimed khalif at Bagdad.

He had not been long seated on the throne when he was alarmed by rebellions breaking out in different parts of the empire. These, however, were at last happily extinguished; after which, Thaher Ebn Hoesen had the government of Khorasan conferred upon him and his descendants with almost absolute and unlimited power. This happened in the 205th year of the Hegira, from which time we may date the dismemberment of that province from the empire of the khalifs.

During the reign of this khalif nothing remarkable happened; only the African Molesims invaded the island of Sicily, where they made themselves masters of several places. He died of a surfeit in the 218th year of the Hegira, having reigned 20, and lived 48 or 49 years.

On the death of Al Mamun, his brother Al Motasem, by some of the oriental historians surnamed *Billah*, was saluted khalif. He succeeded by virtue of Al Mamun's express nomination of him to the exclusion of his own son Al Abbas and his other brother Al Kafem who had been appointed by Harun Al Rafid. In the beginning of his reign he was obliged to employ the whole forces of his empire against one Babec, who had been for a considerable time in rebellion in Persia and Persian Irak. This Babec first appeared in the year of the Hegira 201, when he began to take upon him the title of a prophet. What his particular doctrine was, is now unknown; but his religion is said to have differed from all others then known in Asia. He gained a great number of 'profelytes' in Aderbajan and the Persian Irak, where he soon grew powerful enough to wage war with the khalif Al Mamun, whose troops he often beat, so that he was now become extremely formidable. The general sent by Al Motasem to reduce him was Haider Ebn Kaus, surnamed *Affhin*, a Turk by nation, who had been brought a slave to the khalif's court, and, having been employed in disciplining the Turkish militia there, had acquired the reputation of a great captain. By him Babec was defeated with prodigious slaughter, no fewer than 60,000 men being killed in the first engagement. The next year, being the 220th of the Hegira, he received a still greater overthrow, losing 100,000 men either killed or taken prisoners. By this defeat he was obliged to retire into the Gordyzan mountains, where he fortified himself in such a manner, that Affhin found it impossible to reduce him till the year of the Hegira 222. This commander having reduced with invincible patience all Babec's castles one after another, the impossibility was obliged to shut himself up in a strong fortress called *Casabad*, which was now his last resource. Here he defended himself with great bravery for several months; but at last finding he should be obliged to surrender, he made his escape into a neighbouring wood, from whence he soon after came to Affhin, upon that general's promising him pardon. But Affhin no sooner had him in his power, than he first caused his hands and feet, and afterwards his head, to be cut off. Babec had supported himself against the power of the khalifs for upwards of 20 years, during which time he had cruelly massacred 250,000 people; it being his custom to spare neither man, woman, nor child, of the Mahometans or their allies. Amongst the prisoners taken at Casabad there was one Nud, who had been one of Babec's executioners, and who owned that in obedience to his master's commands he had destroyed.

Bagd
27
Khoras
d'Inven
empire

28
Death of
Al Ma

29
War be-
tween d
new kh
Al Mo
sem and
Babec,

30
Babec d
feated.

31
Taken i
soner an
put to de

32
He de
ed vast
numbers
Molesims

294d.

20,000 Moslems with his own hands; to which he added, that vast numbers had also been executed by his companions, but that of these he could give no precise account.

In the 223^d year of the Hegira, the Greek emperor Theophilus invaded the khalif's territories, where he behaved with the greatest cruelty, and by destroying Sozopetra the place of Al Motasem's nativity, notwithstanding his earnest intreaties to the contrary, occasioned the terrible destruction of *Amerium* mentioned under that article. The rest of this khalif's reign is remarkable for nothing but the execution of Alfishin, who was accused of holding correspondence with the khalif's enemies. After his death a great number of idols were found in his house, which were immediately burned, as also several books said to contain impious and detestable opinions.

33
th of
Mota-

In the 227th year of the Hegira died the khalif Al Motasem, in the 48th or 49th year of his age. He reigned eight years eight months and eight days, was born in the eighth month of the year, fought eight battles, had 8000 slaves, and had 8,000,000 dinars and 80,000 dirhems in his treasury at his death, whence the oriental historians give him the name of *Al Mothamen*, or the *Octenary*. He is said to have been so robust, that he once carried a burden of 1000 pounds weight several paces. As the people of Bagdad disturbed him with frequent revolts and commotions, he took the resolution to abandon that city, and build another for his own residence. The new city he built was first called *Samarra*, and afterwards *Sarra Manray*, and stood in the Arabian Irak. He was attached to the opinion of the Motazalites, who maintain the creation of the Koran, and both he and his predecessor cruelly persecuted those who believed it to be eternal.

34
built the
of Sarra
Manray.

Al Motasem was succeeded by Al Wathek Billah, who the following year, being the 228th of the Hegira, invaded and conquered Sicily. Nothing remarkable happened during the rest of his reign; he died in the 232^d year of the Hegira, and was succeeded by his brother Al Motawakkel.

35
suc-
cessors Al
Buck
Al Mo-
kkel.36
strong
of Mo-
tawak-
kel.

The new khalif began his reign with an act of the greatest cruelty. The late khalif's vizier having treated Al Motawakkel ill in his brother's lifetime, and opposed his election to the khalifat, was on that account now sent to prison. Here the khalif ordered him to be kept awake for several days and nights together: after this, being suffered to fall asleep, he slept a whole day and a night; and after he awoke was thrown into an iron furnace lined with spikes or nails heated red hot, where he was miserably burnt to death. During this reign nothing remarkable happened, except wars with the Greeks, which were carried on with various success. In the year 859 too, being the 245th of the Hegira, violent earthquakes happened in many provinces of the Moslem dominions; and the springs at Mecca failed to such a degree, that the celebrated well Zemzem was almost dried up, and the water sold for 100 dirhems a bottle.

37
Al Mo-

In the 247th year of the Hegira the khalif was assassinated at the instance of his son Al Montaser; who succeeded him, and died in six months after. He was succeeded by Al Moftain, who in the year of the Hegira 252 was forced to abdicate the throne by his brother Al Motazz, who afterwards caused him to be pri-

vately murdered. He did not long enjoy the dignity of which he had so iniquitously possessed himself; being deposed by the Turkish militia (who now began to set up and depose khalifs as they pleased) in the 255th year of the Hegira. After his deposition, he was sent under an escort from Sarra Manray to Bagdad, where he died of thirst or hunger, after a reign of four years and about seven months. The fate of this khalif was peculiarly hard: the Turkish troops had mutinied for their pay; and Al Motazz, not having money to satisfy their demands, applied to his mother named *Kabibah* for 50,000 dinars. This she refused, telling him that she had no money at all, although it afterwards appeared that she was possessed of immense treasures. After his deposition, however, she was obliged to discover them, and even deposit them in the hands of the new khalif Al Mokhtadi. They consisted of 1,000,000 dinars, a bushel of emeralds, and another of pearls, and three pounds and three quarters of rubies of the colour of fire.

Bagdad.

38
Hard fate
of Al Mo-
tazz a suc-
ceeding
khalif.

Al Mokhtadi, the new khalif, was the son of one of Al Wathek's concubines named *Korb*, or *Karb*, who is by some supposed to have been a Christian. The beginning of his reign is remarkable for the irruption of the Zenjians, a people of Nubia, Ethiopia, and the country of Caffres, into Arabia, where they penetrated into the neighbourhood of Basra and Cufa. The chief of this gang of robbers, who, according to some of the Arab historians, differed but little from wild beasts, was Ali Ebn Mohammed Ebn Abdalrahman, who falsely gave himself out to be of the family of Ali Ebn Abu Taleb. This made such an impression upon the Shiites in those parts, that they flocked to him in great numbers; which enabled him to seize upon the cities of Basra and Ramla, and even to pass the Tigris at the head of a formidable army. He then took the title of *Prince of the Zenjians*, in order to ingratiate himself with those barbarians of whom his army was principally composed.

39
Irruption of
the Zenjians
in the reign
of Al
Mokhtadi.

In the 256th year of the Hegira, Al Mokhtadi was barbarously murdered by the Turks who had raised him to the throne, and was succeeded by Al Motamed the son of Al Motawakkel. This year the prince of the Zenjians, Ali, or as he is also called *Al Habib*, made incursions to the very gates of Bagdad, doing prodigious mischief wherever he passed. The khalif therefore sent against him one Jolan with a considerable army. He was overthrown, however, with very great slaughter by the Zenjian, who made himself master of 24 of the khalif's largest ships in the bay of Basra, put a vast number of the inhabitants of Obolla to the sword, and seized upon the town. Not content with this, he set fire to it, and soon reduced it to ashes, the houses mostly consisting of the wood of a certain plane-tree called by the Arabians *Saj*. From thence he marched to Abadan, which likewise surrendered to him. Here he found an immense treasure, which enabled him to possess himself of the whole district of Ahwaz. In short, his forces being now increased to 80,000 strong, most of the adjacent territories, and even the khalif's court itself, were struck with terror.

40
Al Habib's
success.

In the 257th year of the Hegira, Al Habib continued victorious, defeated several armies sent against him by the khalif, reduced the city of Basrah, and put 20,000 of the inhabitants to the sword. The follow-

Bagdad.

ing year, the khalif, supported by his brother Al Mowaffek, had formed a design of circumscribing the power of the Turkish soldiery, who had for some time given law to the khalifs themselves. But this year the Zenjians made so rapid a progress in Persia, Arabia, and Irak, that he was obliged to suspend the execution of his design, and even to employ the Turkish troops to assist his brother Al Mowaffek in opposing these robbers. The first of the khalif's generals who encountered Al Habib this year, was defeated in several engagements, and had his army at last entirely destroyed. After this Al Mowaffek and another general named *Mosleh* advanced against him. In the first engagement *Mosleh* being killed by an arrow, the khalif's troops retired; but Al Mowaffek put them afterwards in such a posture of defence, that the enemy durst not renew the attack. Several other sharp encounters happened this year, in which neither party gained great advantage; but, at last, some contagious distempers breaking out in Al Mowaffek's army, he was obliged to conclude a truce, and retire to Wafet to refresh his troops.

In the 259th year of the Hegira, commencing Nov^r 7th 872, the war between the khalif and Al Habib still continued. Al Mowaffek, upon his arrival at Bagdad, sent Mohammed surnamed *Al Mowallad* with a powerful army to act against the Zenjians: but he could not hinder them from ravaging the province of Ahwaz, cutting off about 50,000 of the khalif's subjects, and dismantling the city of Ahwaz; and notwithstanding the utmost efforts of all the khalif's generals, no considerable advantages could be gained either this or the following year.

41
Rebellion
in Fars,
Ahwaz, and
Bafra.

In the 261st year of the Hegira, beginning Oct^{ber} 16th 874, Mohammed Ebn Wafel, who had killed the khalif's governor of Fars, and afterwards made himself master of that province, had several engagements with Al Habib, but with what success is not known. The khalif, having been apprized of the state of affairs on that side, annexed the government of Fars, Ahwaz, and Bafra, to the prefecture he had given to Mufa Ebn Boga, whom he looked upon as one of the best generals he had. Mufa, soon after his nomination to that post, sent Abdalrahman Ebn Mosleh as his deputy to Ahwaz, giving him as a colleague and assistant one Tifam, a Turk. Mohammed Ebn Wafel, however, refusing to obey the orders of Abdalrahman and Tifam, a fierce conflict ensued, in which the latter were defeated, and Abdalrahman taken prisoner. After this victory, Mohammed advanced against Mufa Ebn Boga himself; but that general, finding he could not take possession of his new government without a vast effusion of blood, recalled the deputies from their provinces, and made the best of his way to Sarra Manray. After this, Yakub Ebn Al Leit, having taken Khorasan from the descendants of Thaher, attacked and defeated Mohammed Ebn Wafel, seizing on his palace, where he found a sum of money amounting to 40,000,000 dirhems.

The next year Yakub Ebn Leit being grown formidable by the acquisition of Ahwaz and a considerable portion of Fars, or at least the Persian Irak, declared war against the khalif. Against him Al Motamed dispatched Al Mowaffek; who having defeated him with prodigious slaughter, plundered his camp, and pursued him into Khorasan; where meeting with no opposition,

42
Rebels
defeated, but
cannot be
seduced.

he entered Nisabur, and released Mahomet the Thaherian, whom Yakub had detained in prison three years. As for Yakub himself, he made his escape with great difficulty, tho' he and his family continued several years in possession of many of the conquests he had made. This war with Yakub proved a seasonable diversion in favour of Al Habib, who this year defeated all the forces sent against him, and ravaged the district of Wafet.

The following year, being the 263^d of the Hegira, beginning September 24th 876, the khalif's forces, under the command of Ahmed Ebn Lebuna, gained two considerable advantages over Al Habib; but being at last drawn into an ambuscade, they were almost totally destroyed, their general himself making his escape with the utmost difficulty; nor were the khalif's forces able, during the course of the next year, to make the least impression upon these rebels.

In the 265th year of the Hegira, beginning September 3^d 878, Ahmed Ebn Tolun rebelled against the khalif, and set up for himself in Egypt. Having assembled a considerable force, he marched to Antioch, and besieged Sima the governor of Aleppo, and all the provinces known among the Arabs by the name of *Al Awafem* in that city. As the besieged found that he was resolved to carry the place by assault, they thought fit, after a short defence, to submit, and to put Sima into his hands. Ahmed no sooner had that officer in his power, than he caused him to be beheaded; after which he advanced to Aleppo, the gates of which were immediately opened unto him. Soon after, he reduced Damascus, Hems, Hamath, Kinnisrin, and Al Rakka, situated upon the eastern bank of the Euphrates: This rebellion so exasperated Al Motamed, that he caused Ahmed to be publicly cursed in all the mosques belonging to Bagdad and Irak; and Ahmed on his part ordered the same malediction to be thundered out against the khalif in all the mosques within his jurisdiction. This year also a detachment of Al Habib's troops penetrated into Irak, and made themselves masters of four of the khalif's ships laden with corn; then they advanced to Al Nomanic, laid the greatest part of it in ashes, and carried off with them several of the inhabitants prisoners. After this they possessed themselves of Jarjaraya, where they found many prisoners more, and destroyed all the adjacent territory with fire and sword. This year there were four independent powers in the Moslem dominions, besides the house of Ommiyah in Spain; viz. The African Moslems, or Aglabites, who had for a long time acted independently; Ahmed in Syria and Egypt; Al Leit in Khorasan; and Al Habib in Arabia and Irak.

In the 266th year of the Hegira, beginning August 23^d 879, Al Habib reduced Ramhormoz, burnt the stately mosque there to the ground, put a vast number of the inhabitants to the sword, and carried away great numbers, as well as a vast quantity of spoil.— This was his last successful campaign; for the year following, Al Mowaffek, attended by his son Abul Abbas, having attacked him with a body of 10,000 horse, and a few infantry, notwithstanding the vast disparity of numbers (Al Habib's army amounting to 100,000 men), defeated him in several battles, recovered most of the towns he had taken, together with an immense quantity of spoil, and released 5000 women that had been

Bagdad.

43
Al Habib
still victo-
rious.

44
Rebellion
in Egypt
which can-
not be sup-
pressed.

45
Four inde-
pendent
powers in
the khalif's
non-indo-
minions.

46
Al Habib's
bad success
and death.

g4d. been thrown into prison by these barbarians. After these victories, Al Mowaffek took post before the city of Al Mabiya', built by Al Habib, and the place of his residence; burnt all the ships in the harbour; thoroughly pillaged the town; and then entirely dismantled it. After the reduction of this place, in which he found immense treasures, Al Mowaffek pursued the flying Zenjians, put several of their chiefs to the sword, and advanced to Al Moktara, a city built by Al Habib. As the place was strongly fortified, and Al Habib was posted in its neighbourhood, with an army, according to Abu Jaafar Al Tabari, of 300,000 men, Al Mowaffek perceived that the reduction of it would be a matter of some difficulty. He therefore built a fortress opposite to it, where he erected a mosque, and coined money. The new city, from its founder, was called by the Arabs *Al Mowaffekkia*, and soon rendered considerable by the settlement of several wealthy merchants there. The city of Al Mokhtara being reduced to great straits was at last taken by storm, and given up to be plundered by the khalif's troops; after which Al Mowaffek defeated the numerous forces of Al Habib in such a manner, that they could no more be rallied during that campaign.

The following year, being the 268^h of the Hegira, Al Mowaffek penetrated again into Al Mabiya', and demolished the fortifications which had been raised since its former reduction, though the rebels disputed every inch of ground. Next year he again attacked Al Habib with great bravery; and would have entirely defeated him, had not he been wounded in the breast with an arrow, which obliged him to found a retreat. However, as soon as he was cured of his wound, Al Mowaffek advanced a third time to Al Mabiya', made himself master of that metropolis, threw down the walls that had been raised, put many of the inhabitants to the sword, and carried a vast number of them into captivity.

The 27th year of the Hegira, commencing July 11th 883, proved fatal to the rebel Al Habib. Al Mowaffek made himself a fourth time master of Al Mabiya', burnt Al Habib's palace, seized upon his family, and sent them to Sarra Manray. As for the usurper himself, he had the good fortune to escape at this time; but being closely pursued by Al Mowaffek into the province of Aluwaz, where the shattered remains of his forces were entirely defeated, he at last fell into the hands of the victor, who ordered his head to be cut off, and carried through a great part of that region which he had so long disturbed. By this complete victory Al Mowaffek obtained the title of *Al Nafir Lidunillah*, that is, the protector of Mahometanism. This year also died Ahmed Ebn Tolun, who had seized upon Egypt and Syria, as we have already observed; and was succeeded by his son *Khamarawiyah*.

Between the khalif's forces commanded by Al Mowaffek's son, and those of Khamarawiyah, who had made an irruption into the khalif's territories. The battle was fought between Al Ramla and Damascus. In the beginning, Khamarawiyah found himself so hard pressed, that his men were obliged to give way; upon which, taking for granted that all was lost, he fled with great precipitation, even to the borders of Egypt; but, in the mean time, his troops being ignorant of the flight of their general, returned to the charge, and gained a

complete victory. After this, Khamarawiyah, by his just and mild administration, so gained the affections of his subjects, that the khalif found it impossible to gain the least advantage over him. In the 276th year of the Hegira, he overthrew one of the khalif's generals named *Abul Say*, at Al Bathnia near the city of Damascus; after which he advanced to Al Rakka on the Euphrates, and made himself master of that place. Having annexed several large provinces to his former dominions, and left some of his friends in whom he could confide to govern them, he then returned into Egypt, the principal part of his empire, which now extended from the Euphrates to the borders of Nubia and Ethiopia.

The following year, being the 278th of the Hegira, ⁴³ Al Mowaffek dies. was remarkable for the death of Al Mowaffek. He died of the elephantiasis or leprosy; and, while in his last illness, could not help observing, that of 100,000 men whom he commanded, there was not one so miserable as himself. This year is also remarkable for the first disturbances raised in the Moslem empire by the Karmatians. The origin of this sect is not certainly known; but the most common opinion is, that a poor fellow, by some called *Karmata*, came from Khuzestau to the villages near Cufa, and there pretended great sanctity and strictness of life, and that God had enjoined him to pray 50 times a-day; pretending also to invite people to the obedience of a certain Imam of the family of Mahomet: and this way of life he continued till he had made a very great party, out of whom he chose twelve as his apostles to govern the rest, and to propagate his doctrines. He also assumed the title of prince, and obliged every one of his earlier followers to pay him a dinar a year. But Al Haidam, the governor of that province, finding men neglected their work, and their husbandry in particular, to say those 50 prayers a-day, seized the fellow, and, having put him in prison, swore that he should die. This being overheard by a girl belonging to the governor, she, out of compassion, took the key of the dungeon at night from under her master's head, released the man, and restored the key to its place while her master slept. The next morning the governor found his prisoner gone; and the accident being publicly known, raised great admiration; Karmata's adherents giving out that God had taken him into heaven. After this he appeared in another province, and declared to a great number of people he got about him, that it was not in the power of any person to do him hurt; notwithstanding which, his courage failing him, he retired into Syria, and was never heard of any more. After his disappearance, the sect continued and increased; his disciples pretending that their master had manifested himself to be a true prophet, and had left them a new law wherein he had changed the ceremonies and form of prayer used by the Moslems, &c. From this year, 278, these sectaries gave almost continual disturbance to the khalifs and their subjects, committing great disorders in Chaldea, Arabia, and Mesopotamia, and at length established a considerable principality.

In the 279th year of the Hegira died the khalif Al Motamed, and was succeeded by Al Motaded, son to Al Mowaffek. The first year of his reign, Al Motaded demanded in marriage the daughter of Khamarawiyah, sultan, or khalif, in Egypt; which was agreed to by ⁵⁰ Al Motaded. ⁴⁹ Origin of the Karmatians. ⁵⁰ Sultan of Egypt's daughter married to the khalif him self.

Bagdad. him with the utmost joy, and their nuptials were solemnized with great pomp in the 282^d year of the Hegira. He carried on a war with the Karmatians; but very unsuccessfully, his forces being defeated with great slaughter, and his general Al Abbas taken prisoner. This khalif also granted to Harun, son to Khamarawayah, the perpetual prefecture of Awafam and Kinnifin, which he annexed to that of Egypt and Syria, upon condition that he paid him an annual tribute of 45,000 dinars. He died in the year of the Hegira 289, and was succeeded by his son Al Moctafi.

57
Egypt, &c.
recovered
by the kha-
lif Al Moc-
tafi.

This khalif proved a warlike and successful prince. He gained several advantages over the Karmatians, but was not able to reduce them. The Turks, however, having invaded the province of Mawaralnahr, were defeated with great slaughter; after which Al Moctafi carried on a successful war against the Greeks, from whom he took Seleucia. After this he invaded Syria and Egypt, which provinces he recovered from the house of Ahmed Ebn Tulun.

52
Distressed
state of the
khalifs after
his death.

The reduction of Egypt happened in the 292^d year of the Hegira, after which the war was renewed with success against the Greeks and Karmatians. The khalif died in the 295th year of the Hegira, after a reign of about six years and a half. He was the last of the khalifs who made any figure by their warlike exploits. His successors Al Moktader, Al Kahir, and Al Radi, were so distressed by the Karmatians and numberless usurpers who were every day starting up, that by the 325th year of the Hegira they had nothing left but the city of Bagdad.

53
New office
of Emir Al
Omra in-
stituted by Al
Radi.

In the 324th year of the Hegira, commencing November 30th 935, the khalif Al Radi, finding himself distressed on all sides by usurpers, and having a vizir of no capacity, instituted a new office superior to that of vizir, which he intitled *Emir Al Omra*, or *Commandant of commandants*. This great officer was trusted with the management of all military affairs, and had the entire management of the finances in a much more absolute and unlimited manner than any of the khalifs vizirs ever had. Nay, he officiated for the khalif in the great mosque at Bagdad, and had his name mentioned in the public prayers throughout the kingdom. In short, the khalif was so much under the power of this officer, that he could not apply a single dinar to his own use without the leave of the Emir Al Omra. In the year 325, the Moslem empire, once so great and powerful, was shared among the following usurpers.

54
Division of
the Moslem
empire in
the 325th
year of the
Hegira.

The cities of Wafet, Basra, and Cufa, with the rest of the Arabian Irak, were considered as the property of the Emir Al Omra, though they had been in the beginning of the year seized upon by a rebel called Al Baridi, who could not be driven out of them.

The country of Fars, Faristan, or Persia properly so called, was possessed by Amado'ddawla Ali Ebn Buiya, who resided in the city of Shiraz.

Part of the tract denominated *Al Fehal*, together with Persian Irak, which is the mountainous part of Persia, and the country of the ancient Parthians, obeyed Rucno'ddawla, the brother of Amado'ddawla, who resided at Ispahan. The other part of that country was possessed by Washmakin the Deylamite.

Diyar Rabia, Diyar Beer, Diyar Modar, and the city of Al Mawlef, or Mosul, acknowledged for their sovereign a race of princes called *Hamdanites*.

Egypt and Syria no longer obeyed the khalifs, but Mahomet Ebn Taj, who had formerly been appointed governor of these provinces.

Africa and Spain had long been independent.

Sicily and Crete were governed by princes of their own.

The provinces of Khorasan and Mawaralnahr were under the dominion of Al Nafr Ebn Ahmed, of the dynasty of the Sammanians.

The provinces of Tabrestan, Jorjan, or Georgiana, and Mazanderan, had kings of the first dynasty of the Deylamites.

The province of Kerman was occupied by Abu Ali Mahomet Ebn Eyllia Al Sammani, who had made himself master of it a short time before; and,

Lastly, the provinces of Yamama and Bahrein, including the district of Hajr were in the possession of Abu Thaler the Karmatian.

Thus the khalifs were deprived of all their dominions, and reduced to the rank of sovereign pontiffs; in which light, though they continued for some time to be regarded by the neighbouring princes, yet their power never arrived to any height. In this low state the khalifs continued till the year of the Hegira 656, commencing January 8th 1258. This year was rendered remarkable by the taking of Bagdad by Hulaku the Mogul or Tartar; who likewise abolished the khalifat, putting the reigning khalif Al Mostafem Billah to a most cruel death. These diabolical conquerors, after they had taken the city, massacred, according to custom, a vast number of the inhabitants; and after they had plundered it, set it on fire. The spoil they took from thence was prodigiously great, Bagdad being then looked upon as the first city in the world.

55
History
of the
Tartars

Bagdad remained in the hands of the Tartars or Moguls to the year of the Hegira 795, of Christ 1392, when it was taken by Tamerlane from Sultan Ahmed Ebn Weis; who being incapable of making head against Tamerlane's numerous forces, found himself obliged to send all his baggage over the Tigris, and abandon his capital to the conqueror. He was, however, hotly pursued by his enemy's detachments to the plain of Karbella, where several skirmishes happened, and a considerable number of men were lost on both sides. Notwithstanding this disaster, he found means to escape the fury of his pursuers, took refuge in the territories of the Greek emperor, and afterwards repossessed himself of the city of Bagdad. There he remained till the year of the Hegira 803, when the city was taken a second time by Tamerlane; who nevertheless restored it to him, and he continued sovereign of the place till driven from thence by Miran Shah. Still, however, he found means to return; but in the 815th year of the Hegira was finally expelled by Kara Yusef the Turkman. The descendants of Kara Yusef continued masters of Bagdad till the year of the Hegira 875, of Christ 1470, when they were driven out by Ufun Calfun. The family of this prince continued till the year of the Hegira 914, of our Lord 1508, when Shah Ishmael, surnamed *Sufi* or *Sof*, the first prince of the royal family reigning in Iran or Persia, till the dethroning of the late Shah Husein, made himself master of it. From that time to this Bagdad has continued to be a bone of contention between the Turks and Persians. It was taken by Soliman surnamed the *magnificent*.

56
History
of the
city
since that
time.

Acad. *Acen*, and retaken by Shah Abbas the great, king of Persia: but being at last besieged by Amurath or Morad IV. with a formidable army, it was finally obliged to surrender to him in the year 1638; since which time the Persians have never been able to make themselves masters of it for any length of time.

It is now two miles long, one broad, and five in circumference. The walls are built with brick, covered with earth, and strengthened with large towers like bastions. The ditches are broad, and five or six fathom deep. There are four gates, three on the land side, and one towards the river, which is passed over by a bridge of boats, that are placed at the distance of a boat's length from each other; the number of them is about 40. The castle is within the city, near one of the gates, on the north side of the town, and is built with fine white free stone, but now looks as if it were covered with earth. It is seated partly upon the river, and is surrounded by a single wall. It has likewise small towers, on which cannon are placed. The ditch is narrow, and about two or three fathom deep. On the west side of the river is an open town, which may be entered at any time of the night as well as in the day. This is called by some the *suburbs* of Bagdad; the houses of which are miserably built, as are also those in the city itself, for they are but one story high, and generally raised with earth. All the buildings that are good are owing to the Persians. Some of the mosques are tolerably handsome, with large domes, covered with painted tiles; and there are bazars in the streets, covered on the top, which are full of shops, where the merchants carry on their trade. There are ten caravanseras, or public inns, only two of which are commodious.

The Turks have a garrison here of 10,000 men, which are doubled in time of war, with about 200 pieces of cannon. There are likewise 12,000 militia; and yet Bagdad would be but thinly peopled, if great numbers did not resort thither on account of its trade, for which reason the Armenians and Jews take up near half the city. Some part of the year the air is here intolerably hot; and then the inhabitants lie on the tops of their houses, which are terraced, in the night. The winter is so mild, that the peasants plough the land in December; at which time there are narcissuses, hyacinths, violets, &c. in full flower. There are very few trees or shrubs herabouts, except liquorice which is in great plenty. Nor is there cultivated land about Bagdad sufficient to maintain it with provisions; not but that part of Irak Arabi, that lies between the rivers Euphrates and Tigris, formerly called *Mesopotamia*, is fruitful enough, but it wants a sufficient number of inhabitants; and if it were not for the rivers, by which all sorts of necessaries are brought to their doors, they would often be in a starving condition.

The Mahometan women are very richly dressed, and wear bracelets on their arms, and jewels in their ears. The Arabian women have the partition between their nostrils bored, wherein they wear rings. Not far from this city there are springs of naphtha, which they burn there instead of candles. There are three sorts of Christians among the inhabitants; Nestorians, Armenians, and Jacobites. The first have a church; the two last perform their devotion at a chapel about a mile from Bagdad. Besides the Jews that live in the city, there

are many that come out of devotion, every year, to visit the tomb of the prophet Ezekiel, which they believe to be about 30 miles from this place. This likewise is in the road for the caravans that come out of Persia in pilgrimage to Mecca.

BAGGAGE, in military affairs, denotes the clothes, tents, utensils of divers sorts, provisions, and other necessaries belonging to the army.

Before a march, the waggons with the baggage are marshalled according to the rank which the several regiments bear in the army; being sometimes ordered to follow the respective columns of the army, sometimes to follow the artillery, and sometimes to form a column by themselves. The general's baggage marches first; and each wagon has a flag, shewing the regiment to which it belongs.

Packing up the BAGGAGE, *vasa colligere*, was a term among the Romans, for preparing to go to war, or to be ready for an expedition.

The Romans distinguished two sorts of baggage; a *greater*, and *less*. The lesser was carried by the soldier on his back, and called *farcina*; consisting of the things most necessary to life, and which he could not do without. Hence *colligere farcinas*, packing up the baggage, is used for decamping, *castra movere*. The greater and heavier was carried on horses and vehicles, and called *onera*. Hence *onera vehiculorum, farcinæ hominum*. The baggage-horses were denominated *segmentarii equi*.

The Roman soldiers in their marches were heavy laden; inasmuch, that they were called by way of jeit, *multi mariani*, and *ærunæ*. They had four sorts of luggage, which they never went without, *viz.* corn, or *buccellatum*, utensils, valli, and arms. Cicero observes, that they used to carry with them above half a month's provisions; and we have instances in Livy, where they carried provisions for a whole month. Their utensils comprehended those proper for gathering fuel, dressing their meat; and even for fortification, or intrenchment; and what is more, a chain for binding captives. For arms, the foot carried a spear, shield, saw, basket, rutrum, hatchet, lorum, falx, &c. Also stakes or pales, *valli*, for the sudden fortifying a camp; sometimes seven or even twelve of these pales were carried by each man, though generally, as Polybius tells us, only three or four. On the Trajan column we see soldiers represented with this sardle of corn, utensils, pales, &c. gathered into a bundle and laid on their shoulders. Thus inured to labour, they grew strong, and able to undergo any fatigue in battle; the greatest heat of which never tired them, or put them out of breath. In after-times, when discipline grew slack, this luggage was thrown on carriages and porter's shoulders.

The Macedonians were not less inured to hardship than the Romans: when Philip first formed an army, he forbid all use of carriages; yet, with all their load, they would march, in a summer's day, 20 miles in military rank.

BAGLANA, or **BUGLANA**, a province of the kingdom of Dekkan in the Mogul's empire. It is bounded on the north and east by Guzerat and Ballagat; and on the south and west by that part of Vizianpur called *Konkan*, belonging to the Marattas. It ends in a point at the sea-coast between Daman and Balfora, and is the least province in the kingdom. The Portuguese

Baglana.
Baglana.

Bagnagar
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Bag-pipe.

guene territories begin in this province at the port Damman, 21 leagues south of Surat; and run along the coast by Balsam, Bombay, and Chawl, to Dabul, almost 50 leagues to the north of Goa.

BAGNAGAR, a town of Asia, in the dominions of the Great Mogul, and capital of the kingdom of Golconda in the peninsula on this side the Ganges. The inhabitants within the town are the better sort; the merchants and meaner people inhabiting the suburbs, which is three miles long. It is chiefly remarkable for a magnificent reservoir of water, surrounded with a colonnade supported by arches. It is seated on the river Nera, in E. Long. 96. o. N. Lat. 15. 30.

BAGNARA, a sea-port town of Italy in the kingdom of Naples, in the farther Calabria, with the title of a duchy. E. Long. 16. 8. N. Lat. 38. 15.

BAGNAREA, a town of Italy in St Peter's patrimony, and in the territory of Orvieta, with a bishop's see. E. Long. 12. 10. N. Lat. 42. 36.

BAGNERES, a town of France, in Gascony, and in the county of Bigorre, so called from its mineral waters. It is seated on the river Adour, in E. Long. o. 12. N. Lat. 43. 3.

BAGNIALACK, a large town of Turkey in Europe, in the province of Bosnia. E. Long. 18. 10. N. Lat. 44. o.

BAGNIO, an Italian word, signifying a bath: we use it for a house with conveniences for bathing, cupping, sweating, and otherwise cleansing the body; and sometimes for worse purposes. In Turkey, it is become a general name for the prisons where the slaves are inclosed, it being usual in these prisons to have baths.

BAGNOLAS, a town of Lower Languedoc in France. It has a very handsome square, and two fountains which rise in the middle of the town; the waters of which, being received in a basin, are conveyed by a canal out of town, and from thence to the lands about it. E. Long. 4. 43. N. Lat. 44. 10.

BAGNOLIANS, in church-history, a sect of heretics, who in reality were Manichees, though they somewhat disguised their errors. They rejected the Old Testament, and part of the New; held the world to be eternal; and affirmed that God did not create the soul when he infused it into the body.

BAGOI, among the ancient Persians, were the same with those called by the Latins *spadones*, viz. a species of eunuchs, in whom the canal of the penis was so constricted by a tight vinculum, that they could not emit the semen.

BAG-PIPE, a musical instrument, of the wind kind, chiefly used in Scotland and Ireland. The peculiarity of the bag-pipe, and from which it takes its name, is, that the air which blows it is collected into a leathern bag, from whence it is pressed out by the arm into the pipes. These pipes consist of a bass, and tenor or rather treble; and are different according to the species of the pipe. The bass part is called the *drone*, and the tenor or treble part the *chanter*. In all the species, the bass never varies from its uniform note, and therefore very deservedly gets the name of *drone*; and the compass of the chanter is likewise very limited. There is a considerable difference between the Highland and Lowland bag-pipe of Scotland; the former being blown with the mouth, and the latter with a small bellows; though this difference is not essential, every species of

bag-pipe being capable, by a proper construction of the reeds, of producing music either with the mouth or bellows. The following are the species of bag-pipes most commonly known in this country.

1. The *Irish Pipe*. This is the softest, and in some respects the most melodious of any, so that music-books have been published with directions how to play on it. The chanter, like that of all the rest, has eight holes like the English flute, and is played on by opening and shutting the holes as occasion requires; the bass consists of two short drones, and a long one. The lowest note of the chanter is D on the German flute, being the open note on the counter string of a violin; the small drone (one of them commonly being stopped up) is tuned in unison with the note above this, and the large one to an octave below, so that a great length is required in order to produce such a low note, on which account the drone hath sometimes two or three turns. The instrument is tuned by lengthening or shortening the drone till it sounds the note desired.

2. The *Highland Bag-Pipe*. This consists of a chanter and two short drones, which found in unison the lowest note of the chanter except one. This is exceedingly loud, and almost deafening if played in a room; and is therefore mostly used in the fields, for marches, &c. It requires a prodigious blast to sound it; so that those unaccustomed to it cannot imagine how Highland pipers can continue to play for hours together, as they are often known to do. For the same reason, those who use the instrument are obliged either to stand on their feet, or walk, when they play. This instrument hath but nine notes; its scale, however, hath not yet been reduced to a regular standard by comparing it with that of other instruments, so that we can say nothing about its compass.

3. The *Scotts Lowland Pipe*. This is likewise a very loud instrument, though less so than the former. It is blown with bellows, and hath a bass like the Irish pipe. This species is different from all the rest; as it cannot play the natural notes, but hath F and C sharp. The lowest note of a good bag-pipe of this kind is unison with C sharp on the tenor of a violin tuned concert-pitch; and as it hath but nine notes, the highest is D in alt. From this peculiar construction, the Highland and Lowland bag-pipes play two species of music essentially different from one another, as each of them also is from every other species of music in the world. Hence these two species of bag-pipes deserve notice as curiosities; for the music which they play is accompanied with such peculiar ornaments, or what are intended as such, as neither violin, nor even organ, can imitate, but in a very imperfect manner.

4. The *Small Pipe*. This is remarkable for its smallness, the chanter not exceeding eight inches in length; for which reason, the holes are so near each other, that it is with difficulty they can be closed. This hath only eight notes, the lower end of the chanter being commonly stopped. The reason of this is, to prevent the flurring of all the notes, which is unavoidable in the other species, so that in the hands of a bad player they become the most shocking and unintelligible instruments imaginable; but this, by having the lower hole closed, and also by the peculiar way in which the notes are expressed, plays all its tunes in the way called by the Italians *staccato*, and cannot slur at all. It hath no species of

Bag-pipe.

of music peculiar to itself; and can play nothing which can be much better done upon other instruments; though it is surprising what volubility some performers on this instrument will display, and how much they will overcome the natural disadvantages of it. Some of this species, instead of having drones like the others, have their bass parts consisting of a winding cavity in a kind of short case, and are tuned by opening these to a certain degree by means of sliding covers; from which contrivance they are called *shuttle-piper*.—Besides these, there are a variety of others, called *Italian, German, Organ, &c.* bag-pipes, which have nothing different in their construction from those above described, nor any good quality to recommend them.

As to the origin of bag-pipe music, some are of opinion, that it is to be derived from the Danes; but Mr Pennant thinks differently, and gives the following reasons for deriving it from Italy.

“Neither of these instruments (the Highland and Lowland bag-pipes above described) were the invention of the Danes, or, as is commonly supposed, of any of the northern nations; for their ancient writers prove them to have been animated by the *clangor tubarum*. Notwithstanding they have had their sack-pipe long amongst them, as their old songs prove, yet we cannot allow them the honour of inventing this melodious instrument; but must assert, that they borrowed it from the invaded Caledonians. We must still go farther, and deprive even that ancient race of the credit; and derive its origin from the mild climate of Italy, perhaps from Greece.

“There is now in Rome a most beautiful bas-relievo, a Grecian sculpture of the highest antiquity, of a bag-piper playing on his instrument, exactly like a modern highlander. The Greeks had their *Arkasiake*, or instrument composed of a pipe and blown-up skin: the Romans in all probability borrowed it from them, and introduced it among their swains, who still use it under the names of *pisa* and *cornu-musa*.

“That master of music, Nero, used one; and had not the empire been so suddenly deprived of that great artist, he would (as he graciously declared his intention) have treated the people with a concert, and, among other curious instruments, would have introduced the *utricularius* or bag-pipe. Nero perished; but the figure of the instrument is preserved on one of his coins, but highly improved by that great master: it has the bag and two of the vulgar pipes; but was blown with a bellows, like an organ; and had on one side a row of nine unequal pipes, resembling the syrinx of the god Pan. The bag-pipe, in the unimproved state, is also represented in an ancient sculpture; and appears to have had two long pipes or drones, and a single short pipe for the fingers. Tradition says, that the kind played on by the mouth was introduced by the Danes; as theirs was wind-music, we will admit that they might have made improvement; but more we cannot allow: they were skilled in the use of the trumpet; the highlanders in the pibroch, or bag-pipe.

*Non tuba in usu illis, conjecta at sidia in utrum
Dai belli signum, et marium vocat horrida in arma*.”*

Formerly there were in the life of Skie a kind of colleges where the Highland bag-pipe was taught; the teachers making use of pins stuck in the ground, instead of marks for musical notes. One of these colleges,

George Mackie, the reformer of the Lowland bag-pipe, is said to have attended seven years. He had before been the best performer on that instrument in that part of the country where he lived; but, while attending the college at Skie, he adapted the graces of the Highland music to the Lowland pipe. Upon his return, he was heard with astonishment and admiration; but unluckily, not being able to commit his improvements to writing, and indeed the nature of the instrument scarce admitting of it, the knowledge of this kind of music hath continued to decay ever since, and will probably soon wear out altogether. What contributes much to this is, that bag-pipers, not content with the natural nine notes which their instrument can play easily, force it to play tunes requiring higher notes, which disorders the whole instrument in such a manner as to produce the most horrid discords; and this practice brings, though undeservedly, the instrument itself into contempt.

BAGUETTE, in architecture, a small round moulding, less than an astragal, and so called from the resemblance it bears to a ring.

BAHAMA ISLANDS, called also the *Lucaya islands*, the easternmost of all the Antilles, or Carribses, lying in the Atlantic ocean, stretching from north-east to south-west, between the 21st and 28th degree of north latitude, and between 72 and 81 degrees of west longitude. They are very numerous; but only 12 are particularly noticed by geographers, because the dangers attending the navigation among them are so great, that many of them have scarce ever been visited by Europeans.

It was upon one of these, to which he gave the name of *St Salvadore*, that Columbus first landed when he discovered America. Banzoni, one of the first navigators, says, that the sailor, who on this occasion first discovered land, and called out that he saw a fire, was denied the reward promised to the first discoverer, under a pretence that the same had been discovered by Columbus two hours before; and that for this reason the sailor afterwards went into Africa, and turned Mahometan.

Columbus perceiving that this island was but small, and the inhabitants poor, immediately set sail in quest of richer countries, and the Bahama islands were afterwards totally neglected by the Spaniards. In 1667, one Captain Sayle, an Englishman, was forced upon the island of St Salvadore, now *Providence*, by stress of weather; and upon his return to England, made so favourable a report of the Bahama islands in general to his employers the proprietors of Carolina, that six of them obtained a grant for the island of Providence, and the Bahama islands in general, between the latitudes of 22 and 27 degrees. The names of their first proprietors were George duke of Albemarle, William Lord Craven, Sir George Carteret, John Lord Berkeley, Anthony Lord Ashley, and Sir Peter Colliton. But though this was the first legal settlement that had been made of these islands, they had long before (particularly the island of Providence) been a shelter for pirates, and other disorderly people, who lived either by plundering the wrecks of ships, or supplying with spirits, &c. the ships that happened to touch there.

In 1672, Captain Sayle paid another visit to Providence island; and on his return made the government so sensible of the advantages that would accrue to England

Bahama
Islands.

England from the possession of the Bahama islands in general, that they resolved to send thither a governor and some settlers; and the first governor sent thither was one Mr Chillingworth, a gentleman of capacity and character. By this time the natives of the Bahamas had been either butchered or carried off by the Spaniards or pirates; and Mr Chillingworth, on his arrival, found he had a very unruly set of men to deal with. England was at that time over-run with dissolute people of both sexes; who, embracing the encouragement given by government, shipped themselves off for Providence in great numbers; and these meeting with the pirates and coasters already settled there, the whole formed so ungovernable a colony, that Mr Chillingworth, in endeavouring to reclaim them, was himself forced off to Jamaica, and an unrestrained anarchy ensued among the settlers. These disorders continued for some years; neither the government, nor the proprietors, thinking it worth while to be at the expence of checking them. At last, one Mr Clark accepted of a proprietary commission to be governor; but the Spaniards, who had all along fomented the disorders, no sooner understood that the English intended to resettle the island, than they invaded it, destroyed all the flock, and burnt the houses of the inhabitants. It is even said, that, having carried off the governor in chains, they afterwards cruelly put him to death.

After this depopulation, the island of Providence, and all the other Bahamas, were abandoned; the English removing to Carolina and other American settlements. At the time this disaster happened, the principal town of the island, since called *Nassau*, consisted of 150 houses. The vast consequence of the situation of these islands, however, especially in time of war, prompted a great number of people to come thither again, both from England and the continent of America. By the year 1690, New Providence became so populous, that the proprietors thought fit to appoint one Cadwallader Jones to be their governor; and he accordingly arrived there on the 19th of June that year.

According to all accounts, this governor Jones was of a very rough arbitrary disposition; and as the people he was sent to govern retained pretty much the spirit of their predecessors, it was no wonder that there were frequent quarrels between them. At last Jones being impeached of high treason by one Bulkley, was thrown into prison, where he lay for some time; but afterwards was released, and Bulkley imprisoned. However, the proprietors finding it would be highly improper to continue Jones in his government, removed him, and appointed one Trott to succeed him. Under governor Trott the town of Nassau recovered its former size; its houses amounting to 160; and having a fort for its protection, on which were mounted 28 guns besides demiculverins.

In 1697 the proprietors, with the consent of king William, appointed Nicholas Webb, Esq; to the government of the Bahama islands; and, in this gentleman's time, New Providence enjoyed a state of tolerable tranquillity, and was reckoned to contain about 400 negroes. One Mr Lightfoot, who was afterwards governor, endeavoured to set up a sugar-work on New Providence, for which the soil was extremely proper; but the means taken by a good governor for the improvement of this perverse colony, proved the very

Bahar
Island

means of weakening it: for the pirates, finding now no longer any harbour in the Bahama islands, no longer spent their money there; and the inhabitants being at the same time restrained from the cruel practice of plundering wrecks, grew poor and discontented. Perpetual altercations now happening between them and their governors, their differences were by the Lords proprietors generally referred to the government of South Carolina; which equally discontented the governor and people, both complaining that they were treated only as a dependent province of that colony.

In this untoward situation matters continued till the year 1700, when one Elias Hasket was promoted to the government of the Bahama islands. But he was scarcely settled when the inhabitants put him in irons, and sent him off the island, choosing by their own authority Ellis Lightfoot, Esq; to succeed him. On this occasion the proprietors shewed no resentment, and Lightfoot remained in possession of the government till 1703. At that time the dissensions which prevailed at New Providence, encouraged the French and Spaniards to make a descent upon it from Petit Guaves. The island was then completely ruined; the town of Nassau was burnt, the fort dismantled, its guns nailed up, and the governor with half the negroes carried off. As to the white inhabitants, their enemies took very little concern about them, and they retired to the woods till the danger was over. Returning from thence, and finding the island entirely ruined, they found means to remove themselves to other settlements. So little care did the proprietors take all this time of the affairs of New Providence, that they did not even know the catastrophe that had befallen them: nay, they even named one Birch, to supersede Lightfoot; but when he came thither, he found the island entirely abandoned, so he was obliged to return.

After this the Bahama islands became once more the residence of pirates and free-booters of all kinds, and of all nations, especially the English and Irish, who committed more depredations on the British trade than both the French and Spaniards. At last, upon an address of the House of Lords, king George I. gave orders for fortifying and settling the island of Providence, and expelling these robbers. The plan was committed to Captain Woods Rogers, a celebrated navigator, who in the year 1718 sailed as governor of Providence, with a force sufficient to reduce the pirates. Before his arrival, governor Bennet of Bermudas had sent a sloop to Providence, requiring the pirates to surrender themselves, by which they were entitled to a late proclamation of pardon. About 150 of the pirates, among whom were several of their captains, gladly accepted of this summons, and surrendered themselves. Upon the arrival of Captain Rogers at this island in 1718, he found about 300 men capable of bearing arms; many of whom had been pirates themselves, and none of them under any apprehensions from that wicked fraternity; but all of them determined in the most resolute manner to defend themselves against the French and Spaniards; which, by the assistance of 100 regulars the captain had brought with him, they were very soon enabled to do.

The first measure of Rogers's government was to read his Majesty's commission to himself in presence of all the inhabitants of the island; after which he admitted

mitted to the benefit of the proclamation about 200 of the remaining pirates that furrendered themselves. In settling his council, he nominated fix adventurers who attended him from England; and had the good fortune to meet also with fix inhabitants of the island, who pretended they had never been pirates, upon which he admitted them likewise. He himself had been appointed captain of the independent company that came with him from England; and the judge of the admiralty, the collector of customs, the chief justice, the secretary, the register, the provost marshal and officers, had all their commissions from England. Under his government the colony thrived so well, that in a short time the number of white people amounted to 1500; and so sensible was government of his services, that when he returned to England in 1721 to solicit some supplies, he received a new commission as governor, and had a salary of L. 400 a-year settled upon him. Captain Rogers indeed had interested himself so much in the affairs of his colony, that he greatly hurt his own circumstances; for the Spaniards having twice attacked the Bahama islands with 2000 men, Mr Rogers defeated them without having any support from the other colonies, except what he engaged on his own personal credit. He died within two or three years after his return to his government; and since that time nothing remarkable has happened to these islands, only that the colonies on them have still continued to thrive.

BAHAMA, the largest of all the abovementioned islands, and from which they take their name, is situated in N. Lat. 26. 45. and is about fifteen leagues from the peninsula of Florida. According to the best accounts, it is fifty miles in length, and in some places sixteen in breadth. The air is serene, and the island well watered and fruitful, yet is inhabited only by a few stragglers, who subsist by selling necessities to the ships which the currents drive upon the coast. This island is said to have formerly produced guaiacum, sarsaparilla, and red wood; all of which were destroyed by the Spaniards. The inhabitants are obliged to bring all their necessities from Carolina, excepting some white fowl, and a particular kind of rabbit which they rear. From some papers in the Philosophical Transactions it appears that spermæcti whales have been cast ashore upon these islands; but the writer adds, that he never heard of one of that species being killed in the sea; so fierce and active are they when alive.

BAHAR, or BARRE, in commerce, weights used in several places in the East Indies.

There are two of these weights; one the great bahar, with which they weigh pepper, cloves, nutmegs, ginger, &c. and contains 550 pounds of Portugal, or about 524 lb. 9 oz. avoirdupois weight. With the little bahar, they weigh quicksilver, vermilion, ivory, silk, &c. It contains about 437 lb. 9 oz. avoirdupois weight.

BAHAREN, an island in the Persian gulf, situated in E. Long. 50. o. N. Lat. 26. o. This island is chiefly remarkable for its pearl-fishery, and has often changed its masters. It fell with Ormus under the dominion of the Portuguese, was again restored to Persia by Thamas Khoulî Kan; and after his death the confusion into which his empire was thrown, gave an opportunity to an enterprising and ambitious Arab of taking possession of the island, where he still main-

tains his authority. Baharen was famous for its pearl-fishery even at the time when pearls were found at Ormus, Kerek, Kashty, and other places in the Persian gulf: but it is now become of much greater consequence; all the other banks having been exhausted, while this has suffered no sensible diminution. The time of fishing begins in April, and ends in October. It is confined to a tract four or five leagues in breadth. The pearls taken at Baharen, though not so white as those of Ceylon or Japan, are much larger than those of the former place, and more regularly shaped than those of the latter. They have a yellowish colour; but have also this good quality, that they preserve their golden hue, whereas the whiter kind lose much of their lustre by keeping, especially in hot countries. The annual revenue from the Baharen pearl-fishery is computed at about L. 157,500. The greatest part of the pearls that are uneven are carried to Constantinople and other ports of Turkey, where the larger go to compose ornaments for head-dresses, and the smaller are used in embroideries. The perfect pearls must be reserved for Surat, whence they are distributed through all Indostan.

BAHI, a province of the island of Lucon or Manila, one of the Philippine islands in the East Indies, belonging to the Spaniards. It is remarkable for producing excellent betel, which the inhabitants, Spaniards as well as natives, perpetually chew from morning till night. It is also the place where most of the ships are built. But the natives suffer much from this work; 200 and sometimes 400 of them being constantly employed in it, on the mountains, or at the port of Cavite. The king allows these labourers a piece-of-eight per month, with a sufficient quantity of rice. The whole province contains about 6000 tributary natives.

BAHIA, DE TODOS LOS SANTOS, a province of Brasil in South America, belonging to the Portuguese, and the richest in the whole country; but unhappily the air and climate do not correspond with other natural advantages; yet so fertile is the province in sugar and other commercial articles, that the Portuguese flock hither not only as it is the seat of affluence, but also of pleasure and grandeur. The capital, called *S. Salvador*, or *Ciudad de Bahia*, is populous, magnificent, and beyond comparison the most gay and opulent city in Brasil. It stands on a bay in S. Lat. 12. 11. is strong by nature, well fortified, and always defended by a numerous garrison. It contains 12,000 or 14,000 Portuguese, and about three times as many negroes, besides people of different nations, who chuse to reside in that city.

BAHIR, a Hebrew term signifying *famous* or *illustrious*; but particularly used for a book of the Jews, treating of the profound mysteries of the cabbala, being the most ancient of the Rabbinical works.

BAHUS, a strong town of Sweden, and capital of a government of the same name, seated on a rock in a small island, in E. Long. 11. 10. N. Lat. 57. 52.

BAJA, BAYJAH, or BÉGIA, a town of the kingdom of Tunis in Africa, supposed to be the ancient *Vacca* of Sallust, and *Oppidum Vaggenſe* of Pliny. It was formerly, and still continues to be, a place of great trade, and the chief market of the kingdom for corn, of which the adjacent territories produce such abundance, that they can supply more than the whole kingdom

Baja
Baikal.

with it; and the Tunesians say, that if there was in the kingdom such another town as this for plenty of corn, it would become as cheap as sand. Here is also a great annual fair, to which the most distant Arabian tribes resort with their families and flocks. Notwithstanding all this, however, the inhabitants are very poor, and great part of the land about the town remains uncultivated, through the cruel exactions of the government, and the frequent incursions of the Arabs who are very powerful in these parts. The town stands on the declivity of a hill on the road to Constantina, about 10 leagues from the northern coast, and 36 south-west from Tunis; and hath the convenience of being well watered. On the highest part is a citadel that commands the whole place, but is now of no great strength. The walls were raised out of the ruins of the ancient Vacca, and have some ancient inscriptions.

BAJA, a populous town of Hungary, seated on the Danube, in E. Long. 19. 50. N. Lat. 46. 40.

BAIÆ, an ancient village of Campania in Italy, between the promontory of Misenum and Puteoli, on the Sinus Baianus. It was anciently famous for its hot baths, which served the wealthier Romans for the purposes both of medicine and pleasure. According to some writers, it had its name from *Baius*, one of Ulysses's companions who was there buried. The agreeableness of the situation invited many to build villas and even palaces in its neighbourhood. It is now called *Bajah*, and has some ancient ruins remaining, but is otherwise inconsiderable. E. Long. 14. 45. N. Lat. 41. 6.

BAJADOR, a cape on the west coast of Africa, south of the Canary islands. W. Long. 15. 20. N. Lat. 27. 0.

BAJAZET I. Sultan of the Turks, a renowned warrior but a tyrant, was conquered by Tamerlane, and exposed by him in an iron cage; the fate he had destined for his adversary if he had been the victor. He dashed his head against the bars of this prison, and killed himself, in 1413. See the article *TURKS*.

BAIKAL, a great lake in Siberia, lying between 52 and 55 degrees of north latitude. It is reckoned to be 500 wersts in length; but only 20 or 30 broad, and in some places not above 15. It is environed on all sides by high mountains. In one part of it, which lies near the river Bargusin, it throws up an inflammable sulphureous liquid called *maltha*, which the people of the adjacent country burn in their lamps. There are likewise several sulphureous springs near this lake. Its water at a distance appears of a sea-green colour: it is fresh; and so clear, that objects may be seen in it several fathoms deep. It does not begin to freeze till near the latter end of December, and thaws again about the beginning of May: from which time till September, a ship is seldom known to be wrecked on it; but by the high winds which then blow, many shipwrecks happen. This lake is called by the neighbouring people *Sviatoie More*, or the *Holy Lake*; and they imagine, that when storms happen on it, they will be preferred from all danger by complimenting it with the title of *Sea*. When it is frozen over, people travel upon it in the road to China; but they must be very sharp shod, otherwise they cannot stand upon the ice, which is exceedingly smooth. Notwithstanding that the ice on this lake is sometimes two ells thick,

there are some open places in it to which tempestuous winds will often drive those who are crossing it, in which case they are irrecoverably lost. The camels that pass along have a particular kind of shoes sharp at bottom, and the oxen have sharp irons driven thro' their hoofs, without which it would be impossible for them to pass. Here are plenty of large sturgeon and pike; with many feds of the black, but none of the spotted, kind. It contains several islands; and the borders are frequented by black fables and civet-cats.

BAIL, *BALLIUM*, (from the French *bailler*, which comes of the Greek *βαλλω*, and signifies to deliver into hands), is used in our common law for the freeing or setting at liberty of one arrested or imprisoned upon any action, either civil or criminal, on surety taken for his appearance at a day and place certain.

The reason why it is called *bail*, is because by this means the party restrained is delivered into the hands of those that bind themselves for his forthcoming, in order to a safe keeping or protection from prison; and the end of bail is to satisfy the condemnation and costs, or render the defendant to prison.

With respect to bail in civil cases, it is to be observed, that there is both common and special bail. Common bail is in actions of small concernment, being called *common*, because any sureties in that case are taken; whereas in causes of greater weight, as actions upon bonds, or speciality, &c. where the debt amounts to 10 l. *special* bail or surety must be taken, such as subsidy-men at least, and they according to the value.

The commitment of a person being only for safe custody, wherever bail will answer the fate intention, it ought to be taken; as in most of the inferior crimes: but in felonies, and other offences of a capital nature, no bail can be a security equivalent to the actual custody of the person. For what is there that a man may not be induced to forfeit, to save his own life? and what satisfaction or indemnity is it to the public, to seize the effects of them who have bailed a murderer, if the murderer himself be suffered to escape with impunity? Upon a principle similar to which, the Athenian magistrates, when they took a solemn oath never to keep a citizen in bonds that could give three sureties of the same quality with himself, did it with an exception to such as had embezzled the public money, or been guilty of treasonable practices.

Bail may be taken either in court, or, in some particular cases, by the sheriff or other magistrate; but most usually by the justices of the peace. To refuse or delay to bail any person bailable, is an offence against the liberty of the subject, in any magistrate, by the common law; as well as by the statute Westm. 1. 3 Edw. I. c. 15. and the *habeas corpus* act, 31 Car. II. c. 2. And, lest the intention of the law should be frustrated by the justices requiring bail to a greater amount than the nature of the case demands, it is expressly declared by statute 1 W. & M. II. c. 1. that excessive bail ought not to be required; though what bail shall be called *excessive*, must be left to the courts, on considering the circumstances of the case, to determine. And on the other hand, if the magistrate takes insufficient bail, he is liable to be fined, if the criminal doth not appear.

In civil cases, every defendant is bailable. But it is otherwise in

Criminal

Criminal matters. Regularly, all offences either against the common law or act of parliament, that are below felony, the offender ought to be admitted to bail, unless it be prohibited by some special act of parliament.—By the ancient common law, before and since the conquest, all felonies were bailable, till murder was excepted by statute: so that persons might be admitted to bail almost in every case. But the statute Westm. 1. 3 Edw. I. c. 15, takes away the power of bailing in treason, and in divers instances of felony. The statutes 23 Hen. VI. c. 9. and 1 & 2 Ph. & Mar. c. 13, give farther regulations in this matter: and upon the whole we may collect, that no justices of the peace can bail, 1. Upon an accusation of treason: nor, 2. Of murder: nor, 3. In case of manslaughter, if the prisoner be clearly the slayer, and not barely suspected to be so; or if any indictment be found against him: nor, 4. Such as, being committed for felony, have broken prison; because it not only carries a presumption of guilt, but is also superadding one felony to another: 5. Persons outlawed: 6. Such as have abjured the realm: 7. Persons taken with the mainour, or in the fact of felony: 8. Persons charged with arson: 9. Excommunicated persons, taken by writ de *excommunicato capiendis*: all which are clearly not admissible to bail by the justices. Others are of a dubious nature, as, 10. Thieves openly defamed and known: 11. Persons charged with other felonies, or manifest and enormous offences, not being of good fame: and 12. Accessories to felony, that labour under the same want of reputation. These seem to be in the discretion of the justices, whether bailable or not. The last class are such as *must* be bailed upon offering sufficient surety; as, 13. Persons of good fame, charged with a bare suspicion of manslaughter, or other infamous homicide: 14. Such persons, being charged with petit larceny or any felony, not before specified: or, 16. With being accessory to any felony. Lastly, it is agreed, that the court of king's bench (or any judge thereof in time of vacation) may bail for any crime whatsoever, be it treason, murder, or any other offence, according to the circumstances of the case. And herein the wisdom of the law is very manifest. To allow bail to be taken commonly for such enormous crimes, would greatly tend to elude the public justice: and yet there are cases, though they rarely happen, in which it would be hard and unjust to confine a man in prison, though accused even of the greatest offence. The law has therefore provided one court, and only one, which has a discretionary power of bailing in any case: except only, even to this high jurisdiction, and of course to all inferior ones, such persons as are committed by either house of parliament, so long as the session lasts; or such as are committed for contempts by any of the king's superior courts of justice *.

Clerk of the Bails, is an officer belonging to the court of the King's Bench: he files the bail-pieces taken in that court, and attends for that purpose.

BAIL, or *BALE*, in the sea-language. The seamen call throwing the water by hand out of the ship's or boat's hold, *bailing*. They also call those hoops that bear up the tilt of a boat, its *bails*.

BAILIE, in Scots law, a judge anciently appointed by the king over such lands not erected into a regality as happened to fall to the crown by forfeiture or other-

wise, now abolished. It is also the name of a magistrate in royal boroughs, and of the judge appointed by a baron over lands erected into a barony *.

BAILIFF, (*ballivus*), from the French word *baillif*, that is, *prefectus provincie*: and as the name, so the office itself was answerable to that of France; where there are eight parliaments, which are high courts from whence there lies no appeal, and within the precincts of the several parts of that kingdom which belong to each parliament there are several provinces to which justice is administered by certain officers called *bailiffs*; and in England there are several counties in which justice hath been administered to the inhabitants by the officer who is now called *sheriff* or *viscount*, (one of which names descends from the Saxons, the other from the Normans); and though the sheriff is not called *bailiff*, yet it is probable that was one of his names also, because the county is often called *balliva*. And in the statute of Magna Charta, cap. 28. and 14 Ed. 3. c. 9. the word *bailiff* seems to comprise as well sheriffs, as bailiffs of hundreds. As the realm is divided into counties, so every county is divided into hundreds; within which in ancient times the people had justice ministered to them by the officers of every hundred. But now the hundred courts, except certain franchises, are swallowed in the county-courts; and the bailiff's name and office is grown into contempt, they being generally officers to serve writs, &c. within their liberties. Though, in other respects, the name is still in good esteem: for the chief magistrates in divers towns, are called *bailiffs*, or *baillies*; and sometimes the persons to whom the king's castles are committed are termed *bailiffs*, as the *bailiff of Dover castle*, &c.

Of the ordinary bailiffs there are several sorts, viz. sheriff's bailiffs, bailiffs of liberties, &c.

Sheriff's bailiffs, or sheriff's officers, are either bailiffs of hundreds, or special bailiffs. Bailiffs of hundreds are officers appointed over those respective districts by the sheriffs, to collect fines therein; to summon juries; to attend the judges and justices at the assizes, and quarter-sessions; and also to execute writs and process in the several hundreds. But as these are generally plain men, and not thoroughly skilful in this latter part of their office, that of serving writs, and making arrests and executions, it is now usual to join special bailiffs with them; who are generally mean persons employed by the sheriffs on account only of their adroitness and dexterity in hunting and seizing of their prey.

Bailiffs of liberties are those bailiffs who are appointed by every lord within his liberty, to execute process and do such offices therein as the bailiff errant doth at large in the county; but bailiffs errant or itinerant, to go up and down the county to serve process, are out of use.

There are also bailiffs of forests, and bailiffs of manors, who direct husbandry, fell trees, gather rents, pay quit-rents, &c.

Water-Bailiff, an officer appointed in all port-towns, for the searching of ships, gathering the toll for anchorage, &c. and arresting persons for debt, &c. on the water.

BAILIWICK, that liberty which is exempted from the sheriff of the county; over which liberty the lord thereof appoints his own bailiff, with the like power within his precinct as an under sheriff exercises under

Bailiff,
Bailiwick.

* See *L. 170*,
Part III.
No cxviii.
6. 7.

Baillet
Bailment.

the sheriff of the county : Or it signifies the precinct of a bailiff, or the place within which his jurisdiction is terminated.

BAILLET (Adrian), a very learned French writer and critic, born in 1649, at the village of Neuville near Beauvais in Picardy. His parents were too poor to give him a proper education, which however he obtained by the favour of the bishop of Beauvais, who afterward presented him with a small vicarage. In 1680, he was appointed librarian to M. de Lamoignon, advocate general to the parliament of Paris; of whose library he made a copious index in 35 vols folio, all written with his own hand. He died in 1706, after writing many works, the principal of which are, *A History of Holland from 1609, to the peace of Nimeguen in 1679*, 4 vols 12mo; *Lives of the Saints*, 3 vols folio, which he professed to have purged from fables; *Jugemens des Savans*, which he extended to 9 vols 12mo; and *The Life of Des Cartes*, 2 vols 4to. which he abridged, and reduced to 1 vol. 12mo.

BAILLEUL, a town of France, in the earldom of Flanders, formerly very strong, but now without any fortifications. It has been several times burnt by accident, and contains now only about 500 houses. E. Long. 2. 55. N. Lat. 40. 35.

BAILEMENT, in law, is a delivery of goods in trust, upon a contract, expressed or implied, that the trust shall be faithfully executed on the part of the bailee. As if cloth be delivered, or (in our legal dialect) bailed, to a taylor to make a suit of clothes, he has it upon an implied contract to render it again when made, and that in a workmanly manner. If money, or goods be delivered to a common carrier, to convey from Oxford to London, or from Glasgow to Edinburgh, &c. he is under a contract in law to pay, or carry them to the person appointed. If a horse, or other goods, be delivered to an inn-keeper or his servants, he is bound to keep them safely, and restore them when his guest leaves the house. If a man takes in a horse, or other cattle, to graze and depasture in his grounds, which the law calls *agistment*, he takes them upon an implied contract to return them on demand to the owner. If a pawnbroker receives plate or jewels as a pledge, or security, for the repayment of money lent thereon at a day certain, he has them upon an express contract or condition to restore them if the pledger performs his part by redeeming them in due time; for the due execution of which contract, many useful regulations are made by statute 30 Geo. II. c. 24. And so, if a landlord distrains goods for rent, or a parish officer for taxes, these for a time are only a pledge in the hands of the distrainers; and they are bound by an implied contract in law to restore them on payment of the debt, duty, and expences, before the time of sale; or, when sold, to render back the overplus. If a friend delivers any thing to his friend to keep for him, the receiver is bound to restore it on demand: and it was formerly held, that, in the mean time he was answerable for any damage or loss it might sustain, whether by accident or otherwise; unless he expressly undertook to keep it only with the same care as his own goods, and then he should not be answerable for theft or other accidents. But now the law seems to be settled on a much more rational footing; that such a general bailment will not charge the bailee with any loss, unless it hap-

pens by gross neglect, which is construed to be an evidence of fraud: but, if the bailee undertakes specially to keep the goods safely and securely, he is bound to answer all perils and damages that may befall them for want of the same care with which a prudent man would keep his own.

BAILO; thus they style at Constantinople the ambassador of the republic of Venice, who resides at the Porte. This minister, besides his political charge, acts there the part of a consul of Venice.

BAINBRIDGE (Dr John), an eminent physician and astronomer, born at Abby de la Zouche in Leicestershire, in 1582. He taught a grammar-school for some years, and practised physic, employing his leisure hours in astronomy, which was his favourite study: at length he removed to London, was admitted a fellow of the college of physicians, and raised his character by his description of the comet in 1618. The next year Sir Henry Savile appointed him his first professor of astronomy at Oxford; and the masters and fellows of Merton-college made him first junior, and then superior, reader of Linacre's lecture. He died in 1643, having written many works, some of which have never been published: but the MSS. are preserved in the library of Trinity-college, Dublin.

BAIOCAO, a copper-coin, current at Rome, and throughout the whole state of the church, ten of which make a julio, and an hundred a Roman crown.

BAIRAM, or BEIRAM, a Turkish word which signifies a solemn feast. The Mahometans have two Bairams; the *Great*, and the *Little*. The *Little Bairam* is properly that held at the close of the fast Ramazan, beginning with the first full moon in the following month Shawal. This is called in Arabic *Id al Fetz*, or the *Fest of breaking the Fast*; by European writers, the *Turkish Easter*, because it succeeds Ramazan, which is their Lent, more usually the *Great Bairam*, because observed with great ceremony and rejoicing at Constantinople, and through Turkey, for three days, and in Persia for five or six days, at least by the common people, to make themselves amends for the mortification of the preceding month.—The feast commencing with the new moon, the Mahometans are very scrupulous in observing the time when the new moon commences; to which purpose, observers are sent to the tops of the highest mountains, who, the moment they spy the appearance of a new moon, run to the city, and proclaim *Muzdaluk*, "welcome news;" as it is the signal for beginning the festivity.—The *Great Bairam*, is properly that held by the pilgrims at Mecca, commencing on the tenth of Dhu Ihajja, when the victims are slain, and lasting three days. This is called by the Arabs, *Id al adba*, that is, the *feast of sacrifice*, as being celebrated in memory of the sacrifice of Abraham, whose son God redeemed with a great victim. By European writers it is called the *Lesser Bairam*, as being less taken notice of by the generality of the people, who are not struck with it, because the ceremonies, it is observed withal, are performed at Mecca, the only scene of the solemnity.—On the feast of Bairam, after throwing little stones, one after another, into the valley of Mina, they usually kill one or more sheep, some a goat, bullock, or even a camel; and, after giving part thereof to the poor, eat the rest with their friends. After this, they shave themselves. The

Baillo
Bairam.

second is a day of rest. On the third, they set out on their return home.

BAIT, among fishermen, implies a substance proper to be fastened to a hook, in order to catch the different sorts of fish. See FISHING.

BAITING, the act of smaller or weaker beasts attacking and harrassing greater and stronger. In this sense we hear of the baiting of bulls or bears by mastiffs, or bull-dogs with short noses that they may take the better hold.

Utility may be pled, in some degree, in justification of bull-baiting. This animal is rarely killed without being first baited; the chaffing and exercise thereof makes his flesh tenderer and more digestible. In reality, it disposes it for putrefaction; so that, unless taken in time, baited flesh is soon lost. But a spirit of barbarism had the greatest share in supporting the sport: bulls are kept on purpose, and exhibited as standing spectacles for the public entertainment. The poor beasts have not fair play: they are not only tied down to a stake, with a collar about their necks, and a short rope, which gives them not above four or five yards play; but they are disarmed too, and the tips of their horns cut off, or covered with leather, to prevent their hurting the dogs. In this sport, the chief aim of the dog is to catch the bull by the nose, and hold him down; to which end, he will even creep on his belly: the bull's aim, on the contrary, is, with equal industry, to defend his nose; in order to which, he thrusts it close to the ground, where his horns are also in readiness to toss the dog.—Bull-baiting was first introduced into England, as an amusement, in the reign of King John, about 1209.

BAJULUS, an ancient officer in the court of the Greek emperors. There were several degrees of bajuli; as, the grand *bajulus*, who was preceptor to the emperor; and the simple *bajuli*, who were sub-preceptors.

The word is derived from the Latin verb *bajulare*, to carry or bear a thing on the arms or on the shoulders; and the origin of the office is thus traced by antiquaries. Children, and especially those of condition, had anciently, beside their nurse, a woman called *gerula*, as appears from several passages of Tertullian; when weaned, or ready to be weaned, they had men to carry them about and take care of them, who were called *geruli* and *bajuli*, a *gerendo* & *bajulando*. Hence it is, that governors of princes and great lords were still denominated *bajuli*, and their charge or government *bajulatio*, even after their pupils were grown too big to be carried about. The word passed in the same sense into Greece.

BAJULUS is also used by Latin writers in the several other senses wherein bailiff is used among us *.

BAJULUS was also the name of a conventual officer in the ancient monasteries, to whom belonged the charge of gathering and distributing the money and legacies left for masses and obits; whence he was also denominated *bajulus obituum novorum*.

BAKAN, a large and handsome town of Asia in the East Indies, in the kingdom of Ava. E. Long. 68. O. N. Lat. 19. 35.

BAKER (Sir Richard), author of the Chronicle of the kings of England, was born at Sissingherst, in Kent, about the year 1568. After going through the usual course of academical learning at Hart-hall,

in Oxford, he travelled into foreign parts; and upon his return home was created master of arts, and soon after, in 1603, received from king James I. the honour of knighthood. In 1620, he was high sheriff of Oxfordshire; but engaging to pay some of the debts of his wife's family, he was reduced to poverty, and obliged to betake himself for shelter to the Fleet prison, where he composed several books, among which, are, 1. *Meditations and Disquisitions on the Lord's Prayer*. 2. *Meditations, &c. on several of the Psalms of David*. 3. *Meditations and Prayers upon the seven Days of the Week*. 4. *Cato Variegatus*, or *Cato's Moral Distichs varied, &c.*—Mr Granger observes, that his Chronicle of the Kings of England was ever more esteemed by readers of a lower class, than by such as had a critical knowledge of history. The language of it was, in this reign, called *polite*; and it long maintained its reputation, especially among country gentlemen. The author seems to have been sometimes more studious to please than to inform, and with that view to have sacrificed even chronology itself to method. In 1658, Edward Philips, nephew to Milton, published a third edition of this work, with the addition of the reign of Charles I. It has been several times reprinted since, and is now carried as low as the reign of George I. Sir Richard also translated several works from the French and Italian; and died very poor, in the Fleet prison, on the 18th of February, 1645.

BAKER (Thomas), an eminent mathematician, was born at Ilton, in Somersetshire, about the year 1625, and entered at Magdalen-hall, Oxon, in 1640; after which he was vicar of Bishop's-Nymmet, in Devonshire, where he wrote *The Geometrical Key*, or the Gate of Equations unlocked; by which he gained a considerable reputation. A little before his death, the members of the Royal Society sent him some mathematical queries, to which he returned so satisfactory an answer, that they presented him a medal, with an inscription full of honour and respect. He died at Bishop's-Nymmet, on the 5th of June, 1690.

BAKER (Thomas), a dramatic writer, was the son of an eminent attorney in the city of London. His turn was entirely to comedy, and his plays are five in number, viz. 1. *A&C* at Oxford. 2. *Fine Ladies airs*. 3. *Hampstead Heath*. 7. *Humours of the age*. 5. *Tunbridge Walks*. All of them have a considerable share of merit; yet only one among the number stands on the present list of acting plays, viz. *Tunbridge Walks*. It is said that the character of Maiden in this play, which is perhaps the original of almost all the Fribbles, beau Mizens, &c. that have been drawn since, and in which effeminacy is carried to an height beyond what any one could conceive to exist in any man in real life, was absolutely, and without exaggeration, a portrait of the author's own former character; whose understanding having at length pointed out to him the folly he had so long been guilty of, he reformed it altogether in his subsequent behaviour, and wrote this character, in order to set it forth in the most ridiculous light, and wran others from that rock of contempt which he had himself for some time been wrecked upon. Whether this gentleman's attachment to the muses drew him from any application to business, or from what other cause, is not known; but during the latter part of his life he stood on indifferent

Baker
Baking.

terms with his father, who allowing him a very scanty income, he was obliged to retire into Worcesterhire, where he is reported to have died of that loathsome disorder the *morbus pediculofus*.

BAKER, a person whose occupation or business is to bake bread. See the articles BAKING and BREAD.

The learned are in great doubt about the time when baking first became a particular profession, and bakers were introduced. It is however generally agreed, that they had their rise in the east, and passed from Greece to Italy after the war with Pyrrhus, about the year of Rome 583. Till which time every house-wife was her own baker: for the word *pistor*, which we find in Roman authors before that time, signified a person who ground or pounded the grain in a mill or mortar to prepare it for baking, as Varro observes. According to Athensæus, the Cappadocians were the most applauded bakers, after them the Lydians, then the Phenicians.—To the foreign bakers brought into Rome, were added a number of freed-men, who were incorporated into a body, or, as they called it, a *collegæ*; from which neither they nor their children were allowed to withdraw. They held their effects in common, and could not dispose of any part of them. Each bake-house had a patronus, who had the superintendency thereof; and these patroni elected one out of their number each year, who had superintendency over all the rest, and the care of the college. Out of the body of the bakers were every now and then one admitted among the senators.—To preserve honour and honesty in the college of bakers, they were expressly prohibited all alliance with comedians and gladiators; each had his shop or bake-house, and they were distributed into fourteen regions of the city. They were excused from guardianships and other offices, which might divert them from their employment.—By our own statutes bakers are declared not to be handicrafts. No man for using the mysteries or sciences of baking, brewing, furgery, or writing, shall be interpreted a handicraft. The bakers were a brotherhood in England before the year 1155, in the reign of king Henry II. though the white bakers were not incorporated till 1307, by king Edward III. and the brown bakers not till 1621, in king James I.'s time. Their hall is in Harp-lane, Thames-street; and their court-day on the first Monday of the month.—They make the 19th company; and consist of a warden, 4 masters, 30 assistants, and 140 men on the livery, besides the commonalty.—The French had formerly a great baker, *grand panetier de France*, who had the superintendency of all the bakers of Paris. But, since the beginning of this century, they have been put under the jurisdiction of the lieutenant-general de police. In some provinces of France, the lord is the only baker in his seignury; keeping a public oven, to which all the tenants are obliged to bring their bread. This right is called *fur-nagium*, or *fur-naticum*, and makes part of the *bannalite*.

BAKEWELL, a pretty large town of Derbyshire, in England, seated on the river Wye, on the north-side of the Peak. It has a considerable trade in lead. W. Long. 2. 30. N. Lat. 55. 15.

BAKHUISEN (Ludolph), a painter and engraver, was born at Embden in 1631, and died 1709. He excelled in sea-pieces, particularly storms.

BAKING, the art of preparing bread, or reducing

meals of any kind, whether simple or compound, into bread. See the article BREAD.

The various forms of baking among us may be reduced into two, the one for unleavened, the other for leavened bread. For the first, the chief is manchet-baking; the process whereof is as follows. The meal, ground and bolted, is put into a trough; and to every bushel are poured in about three pints of warm ale, with barm and salt to season it. This is kneaded well together, with the hands through the brake; or, for want thereof, with the feet, through a cloth: after which, having lain an hour to swell, it is moulded into manchets; which, scorched in the middle, and pricked up at top, to give room to rise, are baked in the oven by a gentle fire.—For the second, sometimes called *cheat-bread* baking, it is thus: Some leaven (saved from a former batch) filled with salt, laid up to sour, and at length dissolved in water, is strained through a cloth into a hole made in the middle of the heap of meal in the trough; then it is worked with some of the flour into a moderate consistence: this is covered up with meal, where it lies all night; and in the morning the whole heap is stirred up, and mixed with a little warm water, barm, and salt, by which it is seasoned, softened, and brought to an even leaven: it is then kneaded, moulded, and baked, as before.

Method of raising a bushel of flour, with a tea-spoonful of barm; by James Stone, of Amport, in Hampshire.—Suppose you want to bake a bushel of flour, and have but one tea-spoonful of barm. Put your flour into your kneading-trough or trendle; then take about three quarters of a pint of warm water, and take the tea-spoonful of thick iteary barm and put it into the water, stir it until it is thoroughly mixed with the water: then make a hole in the middle of the flour large enough to contain two gallons of water, pour in your small quantity; then take a stick about two feet long, (which you may keep for that purpose), and stir in some of the flour, until it is as thick as you would make batter for a pudding; then strew some of the dry flour over it, and go about your usual business for about an hour: then take about a quart of warm water more, and pour in; for in one hour you will find that small quantity raised so, that it will break through the dry flour which you shook over it; and when you have poured in the quart of warm water, take your stick as before, and stir in some more flour, until it is as thick as before; then shake some more dry flour over it, and leave it for two hours more, and then you will find it rise and break through the dry flour again; then you may add three quarts or a gallon of water more, and stir in the flour and make it as thick as at first, and cover it with dry flour again; in about three or four hours more you may mix up your dough, and then cover it up warm; and in four or five hours more you may put it into the oven, and you will have as light bread as though you had put a pint of barm. It does not take above a quarter of an hour more time than the usual way of baking, for there is no time lost but that of adding water three or four times.

The author of this method assures us that he constantly bakes this way in the morning about six or seven o'clock, puts the flour out, and puts this small quantity of barm into the before-mentioned quantity of water, in an hour's time some more, in two hours more

a greater quantity, about noon makes up the dough, and about six in the evening it is put into the oven, and he has always good bread, never heavy nor bitter.

When you find, he says, your body of flour spunged large enough, before you put in the rest of your water, you should, with both your hands, mix that which is spunged and the dry flour all together, and then add the remainder of warm water, and your dough will rise the better and easier.

The reason he assigns why people make heavy bread is, not because they have not barm enough, but because they do not know that barm is the same to flour as fire is to fuel; that, as a spark of fire will kindle a large body by only blowing of it up, so will a thimble-full of barm, by adding of warm water, raise or sponge any body of flour; for warm water gives fresh life to that which is before at work: so that the reason of making bread heavy is, because the body spunged is not large enough, but was made up and put into the oven before it was ripe.

In regard to the difference of seasons, he prescribes, that in the summer you should put your water blood-warm; and in winter, in cold frosty weather, as warm as you can bear your hand in it without making it smart; being sure you cover up your dough very warm in the winter, and your covering of it with dry flour every time you add warm water will keep in the heat; when you have added six or eight quarts of warm water, as before mentioned, in such a gradual way, you will find all that body of flour which is mixed with the warm water, by virtue of that one tea-spoonful of barm, brought into great agitation, waxing, or fermenting; for it is to the flour what the spirit is to the body, it soon fills it with motion.

BAKOU, a town of Persia, in the province of Shivan, situated at the extremity of the Gulf of Gililan on the Caspian Sea. E. Long. 51. 30. N. Lat. 40. 20.

BALA, a town of Merionethshire in Wales. W. Long. 3. 37. N. Lat. 52. 54.

BALÆNA, or WHALE, in zoology, a genus of the mammalia class, belonging to the order of cetæ. The characters of this genus are these: The balæna, in place of teeth, has a horny plate in the upper jaw, and a double fistula or pipe for throwing out water. The species are four, viz.

1. The mysticetus, or common whale, which has many turnings and winding in its nostrils, and has no fin on the back. This is the largest of all animals; it is even at present sometimes found in the northern seas 90 feet in length; but formerly they were taken of a much greater size, when the captures were less frequent, and the fish had time to grow. Such is their bulk within the arctic circle; but in those of the torrid zone, where they are unmolested, whales are still seen 160 feet long. The head is very much disproportioned to the size of the body, being one third the size of the fish: the under lip is much broader than the upper. The tongue is composed of a soft spongy fat, capable of yielding five or six barrels of oil. The gullet is very small for so vast a fish, not exceeding four inches in width. In the middle of the head are two orifices, through which it spouts water to a vast height, and with a great noise, especially when disturbed or wounded. The eyes are not larger than those of an ox, and when the crystalline humour is dried, it does not appear

larger than a pea. They are placed towards the back of the head, being the most convenient situation for enabling them to see both before and behind; as also to see over them, where their food is principally found. They are guarded by eye-lids and eye-lashes, as in quadrupeds; and they seem to be very sharp-sighted.

Nor is their sense of hearing in less perfection; for they are warned, at great distances, of any danger impending against them. It would seem as if nature had designedly given them these advantages, as they multiply little, in order to continue their kind. It is true, indeed, that the external organ of hearing is not perceptible, for this might only embarrass them in their natural element; but as soon as the thin scarf-skin after mentioned is removed, a black spot is discovered behind the eye, and under that is the auditory canal, that leads to a regular apparatus for hearing. In short, the animal hears the smallest sounds at very great distances, and at all times, except when it is spouting water; which is the time that the fishers approach to strike it. What is called *whalebone*, adheres to the upper jaw; and is formed of thin parallel laminæ, some of the longest four yards in length: of these there are commonly 350 on each side, but in very old fish more; about 500 of them are of a length fit for use, the others being too short. They are surrounded with long strong hair, not only that they may not hurt the tongue, but as strainers to prevent the return of their food when they discharge the water out of their mouths.—The real bones of the whale are hard, porous, and full of marrow. Two great strong bones sustain the upper lip, lying against each other in the shape of an half-moon.

The tail is broad and femilunar; and when the fish lies on one side, its blow is tremendous. The tail alone it makes use of to advance itself forward in the water; and it is surprising to see with what force and celerity its enormous bulk cuts through the ocean. The fins are only made use of for turning in the water, and giving a direction to the velocity impressed by the tail. The female also makes use of them, when pursued, to bear off her young, clapping them on her back, and supporting them by the fins on each side from falling. The whale varies in colour; the back of some being red, the belly generally white. Others are black, some mottled, others quite white; according to the observation of Martin, who says, that their colours in the water are extremely beautiful, and that their skin is very smooth and slippery. The outward or scarf skin of the whale is no thicker than parchment; but this removed, the real skin appears, of about an inch thick, and covering the fat or blubber that lies beneath: this is from eight to twelve inches in thickness; and is, when the fish is in health, of a beautiful yellow. The muscles lie beneath; and these, like the flesh of quadrupeds, are very red and tough. The penis is eight feet in length, inclosed in a strong sheath. The teats in the female are placed in the lower part of the belly.

In copulation, the female joins with the male, as is asserted, *more humano*; and once in two years feels the access of desire. Their fidelity to each other exceeds whatever we are told of, even the constancy of birds. Some fishers, as Anderson informs us, having struck one of two whales, a male and a female, that were in company together, the wounded fish made a long and terrible resistance: it struck down a boat with three men

Baleen,
or Whale.

in it, with a single blow of its tail, by which all went to the bottom. The other still attended its companion, and lent it every assistance; till, at last, the fish that was struck, sunk under the number of its wounds; while its faithful associate, disdainful to survive the loss, with great bellowing, stretched itself upon the dead fish, and shared his fate.—The whale goes with young nine or ten months, and is then fatter than usual, particularly when near the time of bringing forth. It is said that the embryo, when first perceptible, is about 17 inches long, and white; but the cub, when excluded, is black, and about 10 feet long. She generally produces one young one, and never above two. When the suckles her young, she throws herself on one side on the surface of the sea, and the young one attaches itself to the teat.

4
Offspring;
parental af-
fection, &c.

Nothing can exceed the tenderness of the female for her offspring; she carries it with her wherever she goes, and, when hardest pursued, keeps it supported between her fins. Even when wounded, she still clasps her young one; and when she plunges to avoid danger, takes it to the bottom; but rises sooner than usual, to give it breath again. The young ones continue at the breast for a year; during which time, they are called by the sailors, *short-heads*. They are then extremely fat, and yield above 50 barrels of blubber. The mother at the same time is equally lean and emaciated. At the age of two years they are called *flunters*, as they do not thrive much immediately after quitting the breast: then yield scarce above 20 or 24 barrels of blubber: from that time forward they are called *skull-fish*, and their age is wholly unknown.

5
Are gre-
garious.

Every species of whale propagates only with those of its own kind, and does not at all mingle with the rest: however, they are generally seen in shoals, of different kinds together, and make their migrations in large companies from one ocean to another. They are gregarious animals; which implies their want of mutual defence against the invasions of smaller, but more powerful, fishes. It seems astonishing, therefore, how a shoal of these enormous animals find subsistence together, when it would seem that the supplying even one with food would require greater plenty than the ocean could furnish. To increase our wonder, we not only see them herding together, but usually find them fatter than any other animals of whatsoever element. We likewise know that they cannot swallow large fishes, as their throat is so narrow, that an animal larger than an herring could not enter. How then do they subsist and grow so fat? A certain sort of small snail, or (as Linnæus says) the *medusa* * or sea-blubber, is sufficient for this supply. Content with this simple food, it pursues no other animal, leads an inoffensive life in its element, and is harmless in proportion to its strength to do mischief.

6
Their food.

* See *Me-
dusa*.

7
Inoffensive-
ness.

As the whale is an inoffensive animal, it is not to be wondered that it has many enemies, willing to take advantage of its disposition, and inaptitude for combat. There is a small animal, of the shell-fish kind, called the *avalu-louse*, that sticks to its body, as we see shells sticking to the foul bottom of a ship. This insinuates itself chiefly under the fins; and whatever efforts the great animal makes, it still keeps its hold, and lives upon the fat, which it is provided with instruments to arrive at.

8
Enemies.

The sword-fish †, however, is the whale's most terrible enemy. "At the sight of this little animal," says Anderson, "the whale seems agitated in an extraordinary manner; leaping from the water as if with affright: wherever it appears, the whale perceives it at a distance, and flies from it in the opposite direction. I have been myself," continues he, "a spectator of their terrible encounter. The whale has no instrument of defence except the tail: with that it endeavours to strike the enemy; and a single blow taking place, would effectually destroy its adversary: but the sword-fish is as active as the other is strong, and easily avoids the stroke; then bounding into the air, it falls upon its great subjugent enemy, and endeavours not to pierce with its pointed beak, but to cut with its toothed edges. The sea all about it is seen dyed with blood, proceeding from the wounds of the whale; while the enormous animal vainly endeavours to reach its invader, and strikes with its tail against the surface of the water, making a report at each blow louder than the noise of a cannon." In calm weather, the fishermen lie upon their oars as spectators of this combat, until they perceive the whale at the last gasp: then they row towards him; and his enemy retiring at their approach, they enjoy the fruits of the victory.—The whale has another desperate enemy, a kind of shark, of different sizes from one to three fathoms; so voracious, that it tears large pieces of flesh from the whale, as if they had been dug with shovels.

Baleen
or Whale
† See *Xi-
phias*.

P
Conflict
with the
sword-fish

To view these animals in a commercial light, we must observe, that the English were late before they engaged in the whale-fishery: it appears by a set of queries, proposed by an honest merchant in the year 1575, in order to get information in the business, that we were at that time totally ignorant of it, being obliged to send to *Biskate* for men *skilful* in the catching of the whale, and ordering of the oil, and one cooper *skilful* to set up the *flaved cask*. This seems very strange; for by the account Othier gives of his travels to King Alfred, near 700 years before that period, it is evident that he made that monarch acquainted with the Norwegians practising the whale-fishery; but it seems all memory of that gainful employ, as well as of that able voyager Othier, and all his important discoveries in the north, were lost for near seven centuries.

Aneccdot
of the
whale-
trade.

Hackluyt's
Col. of Voy.
I. 414.

It was carried on by the Biscayeners long before we attempted the trade; and that for the sake not only of the oil, but also of the whalebone, which they seem to have long trafficked in. The earliest notice we find of that article in our trade is by Hackluyt, who says it was brought from the Bay of St Laurence by an English ship that went there for the *barber* and *finnes* of whales and train oil, A. D. 1594, and who found there 700 or 800 *whale finnes*, part of the cargo of two great *Biskaine* ships, that had been wrecked there three years before. Previous to that, the ladies stays must have been made of split cane, or some tough wood, as Mr Anderson observes in his Dictionary of Commerce; it being certain that the whale fishery was carried on, for the sake of the oil, long before the discovery of the use of whalebone.

The great resort of these animals was found to be on the inhospitable shores of Spitzbergen, and the European ships made that place their principal fishery, and for numbers of years were very successful: the English com-

commenced that business about the year 1598, and the town of Hull had the honour of first attempting that profitable branch of trade. At present it seems to be on the decline, the quantity of fish being greatly reduced by the constant capture for such a vast length of time: some recent accounts inform us, that the fishers, from a defect of whales, apply themselves to seal-fishery, from which animals they extract an oil. This we fear will not be of very long continuance; for these shy and timid creatures will soon be induced to quit those shores by being perpetually harassed, as the morse or walrus has already in a great measure done. We are also told, that the poor natives of Greenland begin even now to suffer from the decrease of the seal in their seas, it being their principal subsistence; so that, should it totally desert the coast, the whole nation would be in danger of perishing through want.

In old times the whale seems never to have been taken on our coasts, but when it was accidentally flung ashore: it was then deemed a royal fish, and the king and queen divided the spoil; the king asserting his right to the head, her majesty to the tail.—For the manner of taking whales, see *Whale-Fishery*.

2. The physalus, or fin-fish, is distinguished from the common whale by a fin on the back, placed very low and near the tail. The length is equal to that of the common kind, but much more slender. It is furnished with whale-bone in the upper jaw, mixed with hairs, but short and knotty, and of little value. The blubber also on the body of this kind is very inconsiderable. These circumstances, added to its extreme fierceness and agility, which renders the capture very dangerous, cause the fishers to neglect it. The natives of Greenland, however, hold it in great esteem, as it affords a quantity of flesh which to their palate is very agreeable.

The lips are brown, and like a twisted rope: the spout-hole is as it were split in the top of its head, through which it blows water with much more violence, and to a greater height, than the common whale. The fishers are not very fond of seeing it, for on its appearance the others retire out of those seas.

Some writers conjecture this species to have been the *Phocaena*, and *physeter*, or blowing-whale of Oppian, *Ælian*, and *Pliny*: but since those writers have not left the least description of it, it is impossible to judge which kind they meant; for in respect to the faculty of spouting out water, or blowing, it is not peculiar to any one species, but common to all the whale kind.

The physalus inhabits the European and American oceans: it feeds upon herrings and other small fish.

3. The boops, or pike-headed whale, has a double pipe in its snout, three fins like the former, and a hard horny ridge on its back. The belly is full of longitudinal folds or rugæ. It frequents the northern ocean. The length of that taken on the coast of Scotland, as remarked by Sir Robert Sibbald, was 46 feet, and its greatest circumference 20. This species takes its name from the shape of its nose, which is narrower and sharper-pointed than that of other whales.

4. The musculus has a double pipe in its front, and three fins; the under jaw is much wider than the upper one. It frequents the Scotch coasts, and feeds upon herrings.

Linnaeus makes the physeter and delphinus, which are ranked among the whales by some writers, two distinct genera. See *Physeter* and *Delphinus*.

BALAGATE, a province of the Mogul empire, and the largest of the three that compose the kingdom of Dekkan. It has Kandish and Barar to the north, Tellinga to the east, Baglana with part of Guzerat to the west, and Visapur to the south. It is a fruitful and pleasant country, abounding with cotton and sugar. Here they have sheep without horns; but so strong, that when bridled and saddled they will carry boys of ten years of age. Its present capital is Aurenghabad, but formerly was Dowlet Abad; and from the latter the whole province is sometimes called *Dowlet-Abad*.

BALAGATE Mountains, a chain of mountains which divides the coast of Malabar from that of Coromandel, running almost the whole length of the peninsula on this side the Ganges. Some parts of them are covered with fine red earth, which is blown by the strong west winds as far as the island of Ceylon; and when the rays of the sun are reflected from these mountains, they seem to be all on fire. They make surprising alterations in the seasons; for on the north side of cape Comorin, it is winter in May, June, July, August, and September, in which months it is summer on the south side of the cape; on one side there are continual tempests, thunder and lightning, while the other enjoys a constant serenity. When black clouds are gathered about the mountains, they are followed by sudden rain, which causes the overflowing of the rivers, and chokes them up with sand, inasmuch that they are unnavigable for some time afterwards. The buildings and clothes of the inhabitants are scarce sufficient to defend them from the weather. They live upon rice, milk, roots, and herbs, with very little meat: they have likewise a sort of small arrac, but are never given to drunkenness; nor do they import foreign vices, for they never travel abroad.

BALAGNIA, a town of Muscovy in the province of Little Novogorod, seated on the Wolga. E. Long. 45. 5. N. Lat. 50. 36.

BALAGUER, a city of Catalonia in Spain, seated on the north bank of the river Segra, at the foot of a high mountain, on which there was formerly a fortress. E. Long. 0. 48. N. Lat. 41. 38.

BALAMBUAN, or *PADAMBUAN*, a strong town of Asia in the Indies on the east end of the island of Java, and capital of a territory of the same name. E. Long. 115. 30. S. Lat. 7. 50.

BALANCE, or *BALLANCE*, one of the six simple powers in mechanics, principally used in determining the equality or difference of weights in heavy bodies, and consequently their masses or quantities of matter.

The balance is of two kinds; the ancient, and the modern. The ancient, or Roman, called also the *statera Romana*, or steel-yard, consists of a lever or beam, moveable on a centre, and suspended near one of its extremities: the bodies to be weighed are applied on one side of the centre; and their weight is shewn by the division marked on the beam, where the weight, which is moveable along the lever, keeps the steel-yard in equilibrium. This balance is still frequently used in weighing heavy bodies.

The modern balance now generally used consists of a lever or beam suspended exactly in the middle, having scales or basons hung to each extremity. The lever

Balagate
||
Balance.

Plate LV.

is called the *jugum* or *beam*; and the two moieties thereof on each side the axis, the *brachia* or *arms*. The line on which the beam turns, or which divides its brachia, is called the *axis*; and, when considered with regard to the length of the brachia, is esteemed a point only, and called the *centre of the balance*: the handle whereby it is held, or by which the whole apparatus is suspended, is called *trutina*; and the slender part perpendicular to the beam, whereby either the equilibrium or preponderancy of bodies is indicated, is called the *tongue* of the balance. Thus in fig. 4. *a b* is the beam, divided into two equal brachia or arms by the white spot in the centre, which is the axis or centre of the balance, and *c* is the tongue. The trutina, on which the axis is suspended, is not represented in this figure, in order to render the other parts more conspicuous.

It follows, from what has been observed, therefore, that in the Roman balance, the weight used for a counterpoise is the same, but the points of application varies; in the common balance the counterpoise is various, and the point of application the same. The principle on which each is founded, may be very easily understood from the following observations, and the general properties of the lever. See LEVER.

The beam *AB*, fig. 7. is a lever of the first kind; but, instead of resting on a fulcrum, is suspended by something fastened to its centre of motion: consequently the mechanism of the balance depends on the same theorems as the lever.

Hence as the quantity of matter in known weight is to its distance from the centre of motion, so is the distance of the unknown weight to its quantity of matter. Hence the nature and use of the steel-yard is easily known. Let *AB* (fig. 7.) represent an instrument of this kind; *a*, the trutina or handle on which the beam turns; *k*, a ring on which the balance may be suspended on a nail, or hook; *f*, the hook on which the body to be weighed is hung; *c*, a collar or guard by which the hook *f* is fastened to the beam; *g*, a moveable collar; *b*, a swivel; *i*, the counterpoise. From what has been said it evidently follows, that if the body to be weighed be fastened to the hook *f*, and the whole suspended by the ring *k*, the division on which the counterpoise is placed to maintain an equilibrium in the balance, will shew the weight of the body required; provided the weight of the counterpoise *i* be known, and the large divisions, 1, 2, 3, &c. be equal to the distance between the centre of the balance and the screw which fastens the guard *c* to the shorter arm of the balance. It will also be necessary that the steel-yard itself, with its whole apparatus, exclusive of the counterpoise, be *in equilibrio*, when suspended on the ring *k*. If the body to be weighed be heavier than the divisions on the longer arm will indicate, the balance is turned the lower side upwards, and suspended on the other ring *b*, by which means the divisions become shorter, because the distance between the trutina *d*, and the screw on which the guard *c* moves, is less: the divisions in the figure on this side extending to 17, whereas they extend only to six on the other. It will be unnecessary perhaps to observe, that the same precaution, with regard to the centre of gravity when the balance is suspended, is also necessary when this side of the balance is used, as we before mentioned

with regard to the other.

We have already observed, that in the common scales the two brachia or arms of the balance, *e f*, *e g*, fig. 5. are equal to each other, and consequently equal weights placed in the scales *d, d*, will be *in equilibrio* when the balance is suspended on its centre *e*, as in the figure, where the ring at the extremity of the trutina is hung on the tapering rod *a b*, fixed in the foot or basis *c*.

The *Deceitful BALANCE*, or that which cheats by the inequality of its brachia, is founded on the same principle as the steel-yard. Let there be, for example, a balance so constructed, that both the brachia with their scales shall equiperponderate, but that the length of the one arm shall be to that of the other as 10 to 9. In this case, a weight of nine pounds put into the longest arm, will counterpoise one of ten pounds put into the shorter one: but the cheat is immediately discovered by shifting the weight from one scale to the other; in which case, the balance will no longer remain *in equilibrio*.

Affay-BALANCE, a very nice balance used in docimastical operations, to determine exactly the weight of minute bodies. This balance should be made of the best steel, and of the hardest kind; because that metal is not so easily spoiled with rust, as iron; and it is more apt than any other to take a perfect polish, which at the same time prevents the rust.

The structure of the assayer's scale is little different from that of common scales, otherwise than by its nicety and smallness. The longer the beam of it is, the more exact may the weight of a body be found; however, 10 or 12 inches are a sufficient length. Let the thickness of it be so little, that two drams may hardly be hung at either of its extremities, without its bending; for the largest weight put upon it seldom exceeds one dram. The whole surface of this beam must be altogether without ornaments, which only increase the weight and gather dust, &c. The beam is suspended, in a fork, the two legs of which are steel springs joined at top, but kept together below with a brais pliant clasp, parallel, and two lines and a half distant from each other. This clasp being taken off, and the legs of the fork being stretched out, the axis of the beam may be put into two holes made for that purpose at the ends of the legs, or be taken away from them. Let a very sharp needle be fixed in the head of the fork, standing perpendicularly downwards, if the fork is suspended, and so long, as that it may almost touch the top of the tongue of the beam put into the fork when in equilibrium. This needle is the mark of the equilibrium; and, that the artifts may be able to observe this, the legs of the fork must be broader in that place, and have an opening two or three lines wide; this fork may be adorned at pleasure, provided the motion of the balance is not hindered by such ornaments: then take two scales made of thin plate of silver, one inch and a half in diameter, hanging on three small silk strings, almost as long as the beam, tied together at top, with a silver hook in form of an S, and hang them to the extremities of the beam: a smaller silver dish, or blued steel, somewhat less than one inch in diameter, belongs to each of these scales. You first put into these dishes, with a pair of pincers, the bodies to be weighed, or with a spoon or a small shovel, when they are pounded, and then you put them into the scales; therefore the small dishes

Balance. dishes must be perfectly equal in weight. We use them, that bodies may be more conveniently put into and taken out of the scales, and that these, which are vastly thin, may not be bent or soiled, and thence rendered false by wiping.

This balance is suspended on a moveable brafs or copper support, which consists of a pedestal, and of a column set upon it about 20 inches high, at the top of which comes out at right angles an arm one inch long. At the extremity of this arm, put a small pulley three lines in diameter, another at the top of the column, and a third near the bottom of it; all which pulleys must turn very easily on their axis. At the distance of one inch and a half below the upper arm, let another arm one inch and a half long come out of the column at right angles, having a hole through it two lines long, a quarter of a line broad, and placed perpendicularly below the pulley of the upper arm, to receive a small plate, one inch and a half long; and of such breadth and thickness, as that it may freely move up and down, and yet not have too much play within the hole. This plate must also have a small hook at each extremity.

And as such a balance will hardly stand still in the open air, and becomes false when spoiled with dust; it must be put, together with its support, into a small case as represented in fig. 8. having glasses, a, a_1, a_2 , at top and all round it, that you may see what is within.

Manner of using the assay BALANCE.—Pass a silk string over the three pulleys of the support, and tie it at its upper extremity to the small hook introduced into the hole of the inferior arm; then put the support in the middle of the small case, and pass the other extremity of the silk string below, through a hole bored in the middle of the lower part of the frame, containing the window in the forepart of the case, and fasten it to a small weight of a cubic form. Suspend the fork of the balance on the inferior hook of the plate. By this means if you move backwards and forwards the weight fastened to the string, placed upon the top of the drawer jutting out beyond the forepart of the case, the balance within is either lifted up, or let down. But you must put the bodies to be weighed, and the weights themselves, in the small silver dishes; and these, when loaded, into the scales, through the side-windows, which must be opened for that purpose. When any thing is to be added to or taken out of them, you do it with the small pincers; or, if it is powder, with the small shovel or spoon: but you must let the balance down every time any thing is to be added or taken away, that the scales may rest upon the bottom of the case; and shut the windows before the balance is lifted up again, especially if the air is not perfectly calm.

Hydrostatic BALANCE, an instrument contrived to determine accurately the specific gravity of both solid and fluid bodies. It is constructed in various forms; but we shall content ourselves here with describing that which appears of all others the most accurate.

VCG, (fig. 6.) is the stand or pillar of this hydrostatic balance, which is to be fixed in a table. From the top A, hangs, by two silk strings, the horizontal bar BB, from which is suspended, by a ring i , the fine beam of a balance b ; which is prevented from descending too low on either side by the gently springing piece xyz , fixed on the support M. The harnes is annulated

at o , to shew distinctly the perpendicular position of the examen, by the small pointed index fixed above it.

The strings by which the balance is suspended, passing over two pulleys, one on each side the piece at A, go down to the bottom on the other side, and are hung over the hook at v ; which hook, by means of a screw P, is moveable, about one inch and a quarter, backward and forward, and therefore the balance may be raised or depressed so much. But if a greater elevation or depression be required, the sliding piece S, which carries the screw P, is readily moved to any part of the square brafs rod VK, and fixed by means of a screw.

The motion of the balance being thus adjusted, the rest of the apparatus is as follows. HH is a small board, fixed upon the piece D, under the scales d and e , and is moveable up and down in a long slit in the pillar above C, and fastened at any part by a screw behind. From the point in the middle of the bottom of each scale hangs, by a fine hook, a brafs wire $a d$ and $a c$. These pass through two holes $m m$ in the table. To the wire $a d$ is suspended a curious cylindric wire, rs , perforated at each end for that purpose: this wire r is covered with paper, graduated by equal divisions, and is about five inches long.

In the corner of the board at E, is fixed a brafs tube, on which a round wire $h l$ is so adapted as to move neither too tight nor too free, by its flat head I. Upon the lower part of this moves another tube Q, which has sufficient friction to make it remain in any position required: to this is fixed an index T, moving horizontally when the wire $h l$ is turned about, and therefore may be easily set to the graduated wire rs . To the lower end of the wire rs hangs a weight L; and to that a wire $p n$, with a small brafs ball g about one-fourth of an inch diameter. On the other side, to the wire $a c$, hangs a large glass-bubble R, by a horse-hair.

Let us first suppose the weight L taken away, and the wire $p n$ suspended from S; and, on the other side, let the bubble R be taken away, and the weight F suspended at e , in its room. This weight F we suppose to be sufficient to keep the several parts hanging to the other scale in equilibrium; at the same time that the middle point of the wire $p n$ is at the surface of the water in the vessel N. The wire $p n$ is to be of such a size, that the length of one inch shall weigh four grains.

Now it is evident, since brafs is eight times heavier than water, that for every inch the wire sinks in the water it will become half a grain lighter, and half a grain heavier for every inch it rises out of the water: consequently, by sinking two inches below the middle point, or rising two inches above it, the wire will become one grain lighter or heavier. Therefore, if, when the middle point is at the surface of the water in equilibrium, the index T be set to the middle point a of the graduated wire rs , and the distance on each side $a r$ and $a s$ contains 100 equal parts; then, if in weighing bodies the weight is required to the hundredth part of a grain, it may be easily had by proceeding in the following manner.

Let the body to be weighed be placed in the scale d . Put the weight X in the scale e ; and let this be so determined, that one grain more shall be too much, and one grain less too little. Then the balance being moved gently up or down, by the screw P, till the equilibrium be nicely shewn at o ; if the index T be at the

Balance
|
Balayan.

middle point *a* of the wire *r*, it shews that the weights put into the scale *e* are just equal to the weight of the body. By this method we find the absolute weight of the body: the relative weight is found by weighing it hydrostatically in water, as follows.

Instead of putting the body into the scale *e*, as before, let it hang with the weight *F*, at the hook *c*, by a horse-hair, as at *R*, supposing the vessel *O* of water were away. The equilibrium being then made, the index *T* standing between *a* and *r*, at the 36 division, shews the weight of the body put in to be 1095.36 grains. As it thus hangs, let it be immersed in the water of the vessel *O*, and it will become much lighter: the scale *e* will descend till the beam of the balance rest on the support *z*. Then suppose 100 grains put into the scale *d* restore the equilibrium precisely, so that the index *T* stand at the 36 division above *a*; it is evident that the weight of an equal bulk of water would, in this case, be exactly 100 grains.

After a like manner this balance may be applied to find the specific gravity of liquids, as is easy to conceive from what has been said.

BALANCE of Trade. That which is commonly meant by the balance of trade, is the equal importing of foreign commodities with the exporting of the native. And it is reckoned that nation has the advantage in the balance of trade, which exports more of the native commodities, and imports less of the foreign. The reason of this is, that, if the native commodities be of a greater value than are exported, the balance of that account must be made up in bullion or money; and the nation grows so much richer, as the balance of that account amounts to.

BALANCE of a Clock, or Watch, is that part which regulates the beats *.

BALANCE-Fish. See **SQUALUS**.

BALANCER, in the history of insects, a style, or oblong body, ending in a protuberance or head, found under each wing of the two-winged flies; these serve to poise the body of the fly.

BALANCING, among seamen, the contracting a fail into a narrower compass, in a storm, by retrenching, or folding up a part of it at one corner: this method is used in contradistinction to reefing, which is common to all the principal fails; whereas balancing is peculiar to few, such as the mizen of a ship, and the main-fail of those vessels wherein it is extended by a boom. See **BOOM** and **REEF**.—The balance of the mizen is thus performed: the mizen yard is lowered a little, then a small portion of the fail is rolled up at the peak or upper corner, and fastened to the yard about one fifth inward from the outer end or yard arm toward the mast. See **MIZEN**.—A boom main-fail is balanced, after all its reefs are taken in, by rolling up a similar portion of the hindmost or aftmost lower corner called the *clue*, and fastening it strongly to the boom, having previously wrapped a piece of old canvas round the part (which is done in both cases) to prevent the fail from being fretted by the cord which fastens it.

BALANUS, in zoology, the trivial name of a species of *lepas*. See **LEPAS**.

BALAUZIA, in botany. See **PUNICA**.

BALAYAN, a province of the island of Manila in the East Indies, belonging to the Spaniards.—It lies

next to the city of Manila, and extends along the coast on the east side of the island, a little beyond the bay of Batangas. There were formerly gold mines in it, but they have been long since abandoned. It is inhabited by about 2500 tributary Indians, and abounds in cotton, rice, and palm-trees. The province is well cultivated; and the Spaniards, generally speaking, have country-houses in it.

BALBASTRO, an episcopal town of Spain, in the kingdom of Arragon, and capital of a district of the same name. E. Long. *c.* 20. N. Lat. 41. 50.

BALBEC, a city of Asia, in Syria, anciently called *Heliopolis*, and by the Arabians the wonder of Syria.

It is now, however, remarkable only for its ruins *.
* See *Hel.*
opolis.

BALBINUS (Decimus Cælius), the Roman emperor, being chosen by the senate in 237, was massacred by the soldiers, who had a dislike to such emperors as were elected only by the senators. This prince was eloquent, and wrote pretty good verses.

BALBOA (Vasco Nugnes de), a Castilian; a celebrated navigator, and one of the first discoverers of South America. He was beheaded by the Spanish governor of St Mary, through jealousy of his growing reputation, in 1517, aged 42.

BALBUS (Lucius Cornelius Theophanes) was born at Cadiz, and distinguished himself by his valour in the war carried on by the Romans in Spain against Sertorius and the Lusitanians, on which account Pompey gave him the privileges of a Roman citizen. He was consul in the 714th year of Rome, and was the first foreigner on whom that dignity was conferred. He was the friend of Pompey, Cæsar, Crassus, and Cicero.—There were many other illustrious Romans of the name of *Balbus*.

BALCONY, in architecture, a projecture in the front of a house, or other building, supported by pillars or consoles, and encompassed with a balustrade.

BALDACHIN, or **BALDAQUIN**, in architecture, a building in form of a canopy, supported by pillars, and frequently used as a covering to insulated altars. Some also use the term *baldachin* for the shell over a door.

BALDINUCCI (Philip), of Florence; a connoisseur in the polite arts, and the continuator of Vasar's lives of the painters. He died in 1696, aged 72.

BALDIVIA, or **VALDIVIA**, a sea-port town of Chili, in America, belonging to the Spaniards. It is situated between the rivers Callacules and Portero, where they fall into the south sea. W. Long. 80. 5. S. Lat. 40. 5. It was built in 1551 by the Spanish general Baldivia, from whom it takes its name. We may judge of its importance from the sum granted annually by the king for maintaining the garrison, and keeping the fortifications in repair, being no less than 300,000 pieces of eight. It is defended by four strong castles, mounting 100 pieces of fine brass cannon. Notwithstanding which, however, as the garrison is composed mostly of transported criminals, on whom no dependance can be placed, and generally ill supplied with ammunition, &c. it could make but a poor defence. In 1643 it was easily taken by the Dutch, who would probably have maintained their conquest against all the power of the Spanish viceroy, had they not been obliged to relinquish it through sickness and famine. The inhabitants of Baldivia amount to about 2000.
The

Balbastro
|
Baldivia.

* See *Watch*
and *Clock*
Making.

Fig. 2.
Blow-pipe.
N^o 1.

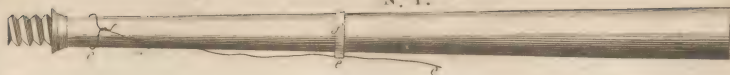


Fig. 2. N^o 2.

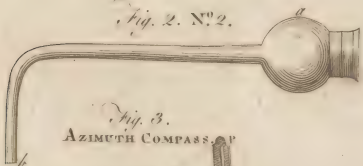


Fig. 1.



Fig. 4.

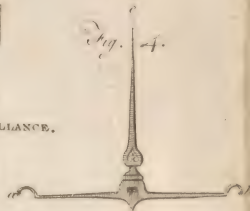


Fig. 3.
AZIMUTH COMPASS.

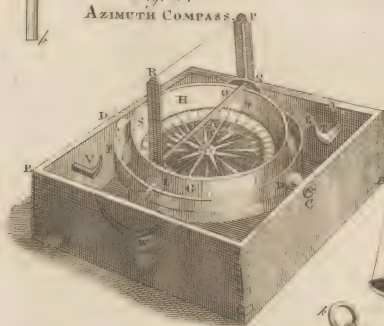


Fig. 5.
COMMON BALANCE.



Fig. 6.
HYDROSTATIC
BALANCE.

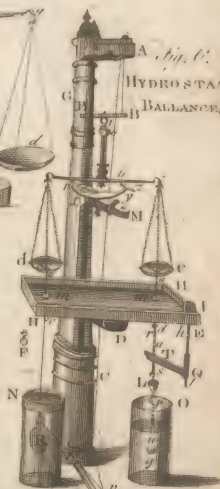


Fig. 7.
ROMAN BALANCE.



Fig. 8. ASSAY BALANCE.



Fig. 9. BASALTES.



Fig. 10.
BELEMNITE.





Baldness
Bale.

The trade is less considerable than formerly, because the gold mines in the neighbourhood are shut up; yet several large ships are employed in the trade between this port and that of Lima, which consists of gold, corn, hides, and salt provisions, which are exchanged for slaves, sugar, chocolate, and European commodities and manufactures.

BALDNESS, a defect of hair, chiefly on the scin-
put. It differs from *alopecia*, *areæ*, *opifiosis*, and *tinea*, as these all arise from some vice in the nutritious humour; *baldness*, from the defect of it. When the eyelids shed their hair, it is called a *ptilosis*. Among the causes of baldness, immoderate venery is reputed one of the chief: old age usually brings it on of course. Some will have the proximate cause of baldness to be the dryness of the brain, and its shrinking from the cranium; it having been observed, that in bald persons there is always a vacuity or empty space between the skull and the brain.—*Calvus*, *bald-pate*, was a frequent term of reproach among the Romans; among whom this defect was in great discredit. Hence divers arts to conceal it, as false hair, a *galericulus* contrived on purpose. The later Romans, however, seem to have been reconciled to baldness; for we find among them a kind of officers, or servants, called *glabratores*, or *glabrarii*, whose business was to take off the hair from all parts, even from the head. In an ancient inscription, there is mention of one Diophantus, *TI. CÆSARIS ORNATOR GLABR.* that is, *ornator Glabrarius*.

BALDOC, a town of Herefordshire, in England, chiefly noted for its trading in malt. W. Long, c. 10. N. Lat. 51. 55.

BALDOCK (Ralph de), bishop of London in the reigns of Edward I. and II. was educated at Moreton-college, in Oxford; became dean of St Paul's; was afterwards promoted to the see of London; and at last was made lord high chancellor of England. He had a very amiable character both for morals and learning; and wrote *Historia Anglica*, or An History of the British Affairs down to his own Time; and, A Collection of the Statutes and Constitutions of the church of St Paul. Bishop Baldock died at Stepney, July 24. 1313.

BALDWIN, archbishop of Canterbury, was born of obscure parents at Exeter, where, in the early part of his life, he taught a grammar-school; after which he took orders, and was made archdeacon of Exeter: but he resigned that dignity, and became a Cistercian monk in the monastery of Ford in Devonshire, of which in a few years he was made abbot. In the year 1180, he was consecrated bishop of Worcester. In 1184, he was promoted to the see of Canterbury by Pope Lucius III. and, by his successor Urban III. was appointed legate for that diocese. He laid the foundation of a church and monastery in honour of Thomas Becket, at Hackington, near Canterbury, for secular priests; but, being opposed by the monks of Canterbury and the Pope, was obliged to desist. In 1190 he crowned king Richard I. at Westminster; and soon after followed that prince to the Holy land, where he died at the siege of Ptolemais. Giraldus Cambrensis, who accompanied him in this expedition, says he was of a mild disposition, and of great abstinence. He wrote various tracts on religious subjects, which were collected and published by Bertrand Tiffier in 1662.

BALE (John), bishop of Ossory in Ireland, was

Bale.

born at Cove, near Dunwich in Suffolk, in the year 1495. At 12 years of age he was entered in the monastery of Carmelites at Norwich, and was thence sent to Jesus-college in Oxford. He was educated a Roman catholic, but was converted to the Protestant religion by Thomas lord Wentworth. On the death of lord Cromwell, favourite of Henry VIII. who protected him from the persecutions of the Romish clergy, he was obliged to retire into the Low Countries, where he continued eight years. Soon after the accession of Edward VI. he was recalled; and being first presented to the living of Bishop's-Stoke in Hampshire, in 1552, he was nominated to the see of Ossory. During his residence in Ireland he was remarkably assiduous in propagating the Protestant doctrines; but to very little purpose, and frequently at the hazard of his life. Once, in particular, they murdered five of his domestics, who were making hay in a meadow near his house; and would probably have done the same by him, if the sovereign of Kilkenny had not come to his assistance with 100 horse and 300 foot. On the accession of Queen Mary, the tide of opposition became so powerful, that, to avoid assassination, he embarked for Holland, but was very unfortunate in his escape. First he was taken by a Dutch man of war, and robbed by the captain of all his effects. Then, being forced by stress of weather into St Ives in Cornwall, he was confined on suspicion of treason. Being however released after a few days confinement, the ship anchored in Dover road, where he was again seized on a false accusation. After his arrival in Holland, he was kept prisoner for three weeks, and at length obtained his liberty on paying 30 l. From Holland he travelled to Basil in Switzerland, where he continued till Queen Elizabeth ascended the throne. After his return to England, he was, in 1560, made prebendary of Canterbury, probably not chusing to return to his former flock of wolves. He died in November 1563, at Canterbury, in the 68th year of his age. He was so severe a writer against the church of Rome, that his books are particularly prohibited in the expurgatory index published at Madrid, in folio, in the year 1667. He is the earliest dramatic writer in the English language, or at least author of the first pieces of that kind that we find in print. Of his writings in that way, no fewer than 21 have been enumerated; only 3 of them, however, have been seen in print, viz. 1. God's promises, an interlude; 2. St John Baptist, an interlude; 3. Concerning the laws of nature corrupted: the first of which has been reprinted by Doddsley in the first volume of his collection of old plays, and the only copy extant of the last is preserved in St Sepulchre's library in Dublin. As to the rest, they are mentioned by himself, as his own, in his account of the writers of Britain before mentioned.—He also translated the tragedies of Parnachius.—His other works are very numerous; but the chief is his Catalogue of British authors: a book of some merit, as it contains some information which is not elsewhere to be found; but he has destroyed his credit by his intemperate Billinggate abuse of all those who differed from him in religion. The authentic part of his work is transcribed from Leland. The title of it is, *Illustrium Majoris Britanniae scriptorum catalogus, a Japheto sanctissimi Noah filio ad an. Dom. 1557.*

BALE, in commerce. Any goods packed up in cloth, and.

Bale
||
Balifore.

and corded round very tight, in order to keep them from breaking, or preserve them from the weather; is called a *bale*.—A bale of cotton yarn is from 300 to 400 weight; of raw silk, is from 100 to 400; of lockram or dowlaps, either three, three and a half, or four pieces.

BALÉ-GOODS, among the English merchants, are all such as are imported or exported in bales; but the French give that name to certain hard-wares, and other sorts of merchandize, which come to Paris, and are commonly made by bad workmen, of indifferent materials.

BALEARIC ISLANDS, the ancient name of the islands Majorca, Minorca, and Ivica, in the Mediterranean. See *MAJORCA*, &c.

BALEY (Walter), the son of Henry Baley of Warrnell in Dorsetshire, was born at Potsham in the same county, and educated at Winchester school. From thence he was sent to Oxford; and, after two years probation, was admitted perpetual fellow of New college in the year 1550. Having taken his degrees in arts, he practised physic, and in 1558 was proctor of the university. About this time he obtained a prebend of Wells, which he resigned in 1579. In the year 1561 he was appointed queen's professor of physic, in 1563 proceeded doctor in that faculty, and afterwards became one of her majesty's physicians in ordinary. He was thought skilful in his profession, and had considerable practice. He died in 1592, aged 63; and was buried in the inner chapel of New college. His works are, 1. *A discourse of three kinds of pepper in common use*, 1588, 8vo. 2. *Brief treatise of the preservation of the eye-sight*. First printed in the reign of Elizabeth, in 12mo; afterwards at Oxford in 1616, and 1654, 8vo. 3. *Directions for health, natural and artificial; with medicines for all diseases of the eyes*, 1626, 4to. 4. *Explicitio Galeni de potu convalescentium et senum*, &c. Manuscript, formerly in lord Aylebury's library.

BALI, an island of Asia, in the East Indies, forming the north side of the straits of Java, through which the East-India ships sometimes return from China to Europe; but the passage is commonly difficult on account of contrary winds. The island is extremely populous, and abounds in rice and other productions proper to the climate. The inhabitants are Pagans, and very warlike. E. Long. 115. 30. S. Lat. 9. 0.

BALIAL, or **BALIALOL**, (Sir John de), founder of Balial-college, in Oxford, was the son of Hugh Balial, of Bernard's castle, in the diocese of Durham; and was a person very eminent for his power and riches. During the contents and wars between King Henry III. and his barons, he firmly adhered to the king. In 1263, he began the foundation and endowment of Balial-college, which was afterwards perfected by his widow. He died in the year 1269.

BALIAL, **BALLIAL**, or **BOILLIAL**, (John), the brother of Alexander king of Scotland, and competitor with Robert Bruce for that crown *.

BALISORE, a sea-port town of Asia, in the East Indies, to the north-west of the bay of Bengal. It is about four miles from the sea by land, but 20 by the river; seated in a very fruitful soil producing rice, wheat, aromatic seeds, tobacco, &c. The inhabitants make several sorts of stuffs of cotton, silk, and a kind

Balistes
||
Balk.

of grass. The English, French, and Dutch, have factories here; but they are now of no great account. E. Long. 85. 20. N. Lat. 21. 30.

BALISTES, in ichthyology, a genus of fishes belonging to the order of amphibia nantes. The characters are these: the head is flat; there are eight teeth in each side, and the two anterior ones are longest; in the place of gills, the balistes has an aperture immediately above the pectoral fins; the body is flat, the scales are joined together by the skin, and the belly is keeled. The species of this genus are eight; viz.

1. The monoceros, whose head-fin consists of but one ray, and the tail-rays are carinated. It is called the *unicorn-fish* by Catfish; who informs us, that the guts of this fish are full of small shells and coralline substances, which by the strength and hardness of its jaws it is enabled to ground very small. These fish, he adds, are not eat, being accounted poisonous. They most frequent those seas, amongst the Bahama islands, where the corals are in greatest plenty. 2. The hippidus, whose head-fin is uniradiated; and there is a round black spot in the tail-fin. The body is rough, and bristly towards the tail. The spine or horn is situated between the eyes; the snout is subulated; and instead of a belly-fin, it has a jagged sharp spine. This species is a native of Carolina. 3. The tomentosus, whose head-fin is biradiated, and the body of it towards the hind part is hairy. It is a native of America. 4. The papillosus, has a biradiated back-fin, and a papillous body. 5. The verrucosus, has a tri-radiated back-fin; and the tail is full of little warts. In the place of a belly-fin, this species has a large, thick, warty ray. It has 25 small reversed sharp spines at the side of the tail, disposed in four rows. It is a native of India. 6. The aculeatus has a tri-radiated back-fin; and the spines of the tail lean upon each other. It is also a native of India. 7. The vetula, or old-wife, has a tri-radiated back-fin; the belly-fin is longitudinal, and somewhat carinated; and the tail-fin is forked. It is found at Ascension island. 8. The ringens, has a tri-radiated back-fin; there are three folds on each side of the head, and the tail-fin is forked. This species is likewise found at Ascension island.

BALIVO AMOVENDO, in law, was a writ for removing a bailiff from his office, for want of having sufficient land in his bailwick to answer the king and his people, according to the statute of Westminster, 2 reg. Orig. 78.

BALK, among builders, is sometimes used for the summer-beam of a house; sometimes for the poles and rafters, which support the roofs of barns, &c.; and sometimes for the beams used in making sea-holds.

BALK, or **BALKH**, a province of Great Bukharia in Asia, about 360 miles long, and 250 broad, situated to the south of the province of Samarkand, and to the east of Bukharia Proper. It is the least of the three provinces that make up what is called *Great Bukharia*; but being extremely fertile and well cultivated, the prince draws a great revenue from it. The country particularly abounds with silk, of which the inhabitants make pretty manufactures. The Uzbecks subject to the khan of Balkh are the most civilized of all the Tartars inhabiting Great Bukharia, owing probably to their commerce with the Persians: they are likewise more industrious, and more honest, than the rest;

Plate I.VI.
fig. 2.

Fig. 3.

* See the article Scotland.

rest; but in other respects have the same customs with the rest of the Tartars. The province is subdivided into several counties; the most remarkable of which are Khotlan, or Katlan, Tokharestan, and Badaghshan. Its chief cities are Balk, Fariyab, Talkhan, Badaghshan, and Anderab.

BALK, the capital of the abovementioned province, situated on the frontiers of Persia, in E. Long. 65. 20. N. Lat. 37. C. It is probably the ancient Bactra, capital of the kingdom of Bactria; and is said by the Persians to have been founded by Kay-umarras the first king of Persia, because he met his brother upon the spot where it stood, after he had been lost for a long time; *balkhiden*, or *balghiden*, in the Persian language, signifying to receive and embrace a friend. The first kings of Persia who resided in the province of Media or *Aderbijan*, considered this city as one of their principal frontiers on the side of Scythia. In the 27th year of the Hegira, of Christ 647, Balk was reduced by the Arabs, under the command of Abdallah Ebn Amer. It continued subject to Arab princes till the year of the Hegira 432, of Christ 1041; when it was reduced by Togrol Beg, the Tangrolipix of the Greeks, and prince of the Seljukian dynasty. It was taken by Jenghiz Khan, A. D. 1221, who with his usual and unparalleled cruelty caused all the inhabitants to be brought without the walls and massacred without mercy.

In 1369, Sultan Hoesin the last of the race of Jenghiz Khan was driven from Balkh by Tamerlane, whose successors were driven out by the Uzbecks in the 15th century. It was afterwards redeemed by Shah Ismael Sufi; but finally wrested out of his hands by the Uzbek Tartars, between whom and the Persians it is the occasion of almost continual wars. It was, not long since, the residence of a khan of Tartars. It is the most considerable city possessed in these parts by the Mahometan Tartars, is large, well built, and populous, the houses consisting for the most part of stone or brick. The fortifications consist of bulwarks of earth, fenced without with a strong wall high enough to cover the soldiers employed in defence of those fortifications. As this place is the resort of all the business transacted between the Indies and Great Bukharia, trade flourishes extremely at Balkh; especially as it has a fine river passing through its suburbs, which is of vast service to the town. This river falls into the Amu, in N. Lat. 38. 30. upon the confines of Great Bukharia and Kowarazm. The khan's palace, or castle, is a large edifice built after the oriental manner; and consists almost entirely of marble, of which there are fine quarries in the neighbourhood. The khan of Balk, however, was obliged in 1739 to submit to the Persians under Khoulî Kan; but, since that time, has most probably regained his independency.

BALKERS, in the fishery, persons placed on rocks, and eminences at sea, to spy the herring droves, and give notice to the fishermen, by waving boughs, what way they go, and where they may be found.

BALL, in a general sense, a spherical and round body, whether naturally so, or formed into that figure by art.

BALL, in the military art, comprehends all sorts of bullets for fire-arms, from the cannon to the pistol. Cannon-balls are of iron; musquet-balls, pistol-balls, &c. are of lead. The experiment has been tried of

iron balls for pistols and fuses; but they are justly rejected, not only on account of their lightness, which prevents them from flying straight, but because they are apt to furore the barrel of the pistol, &c.

BALL, in pyrotechnics, is also a composition of various combustible ingredients, serving to burn, smoke, give light, &c. In this sense we read of fire-balls, light-balls, smoke-balls, flink-balls, sky-balls, water-balls, land-balls.

Fire-BALLS, are bags of canvas filled with gunpowder, sulphur, salt-petre, pitch, &c. to be thrown by the soldiers, or out of mortars, in order to fire the houses, incommode trenches, advanced posts, or the like.—The Greeks had divers kinds of fire-balls, or *Πυροβολαιβοι*; one kind called, more particularly, *σκιόλαρις*, or *σκιόλαρις*, made of wood, sometimes a foot or even a cubit long; their heads being armed with spikes of iron, beneath which were hemp, pitch, and other combustibles, which being set on fire, they were cast among the enemy. The preparations of fire-balls, among the moderns, consists of several operations, *viz.* making the bag, preparing the composition, tying, and, lastly, dipping the ball. 1. The bags for this purpose are either oval or round. 2. The composition wherewith fire-balls are filled, is various: To ten pounds of meal-gunpowder add two of salt-petre, one of sulphur, and one of colophony; or, to six pounds of gunpowder, add four of salt-petre, four of sulphur, one of powdered glass, half a pound of antimony, as much camphor, an ounce of sal-ammoniac, and four of common salt, all pulverised. Sometimes they even fill fire-balls with hand grenades. 3. For tying the fire-balls, they prepare two iron rings, one fitted round the aperture, where the ball is to be lighted, the other near its base. A cord is tied to these rings in such a manner, as that the several turns represent semicircles of the sphere cutting the globe thro' the poles: over the cords, extended according to the length of the ball, others are tied, cutting the former at right angles, and parallel to each other, making a knot at each intersection: lastly, after putting in a leaden-bullet, the rest of the space is filled with tow or paper. 4. Thus completed, the fire-ball remains to be dipped in a composition of melted pitch four pounds, colophony two, and linseed oil or oil of turpentine two; after dipping, they cover it round with tow, and dip again, till it be brought to the just diameter required.

Light BALLS, are such as diffuse an intense light around; or they are balls which, being cast out of the hand or a mortar, burn for some time, and illuminate the adjacent parts. 1. Luminous or light-balls for the hand, are made of ground powder, salt-petre, brimstone, camphor, and borax, all sprinkled with oil, and moulded into a mass with suet; and this is wrapped up in tow, with a sheet of strong paper over it. To fire it, they make a hole into it with a bodkin, into which they put some priming that will burn slow. Its use is to be cast into any works they would discover in the night-time. 2. For the larger light-balls, or those to be thrown to a greater distance, they melt equal quantities of sulphur, turpentine, and pitch; and herein dip an earthen or stone-ball, of a diameter much less than that of the mortar out of which the fire-ball is to be cast: then rolling it in gunpowder, and covering it round with gauze, they dip it again, and

and repeat the rest till it come to fit the cavity of the mortar: lastly, they sprinkle it around with gun-powder. This, being once kindled, will strongly illuminate all around the place where it is thrown, and give opportunity to examine the state and condition thereof.

Smoke or Dark BALLS, those which fill the air with smoke, and thus darken a place to prevent discoveries. To prepare a darkening ball, make an oval or spherical bag, melt rosin over the coals, and add an equal part of salt-petre not purified, also of sulphur, and a fifth part of charcoal. The whole being well incorporated, put in tow first shred, and fill the bags with this composition, and dip it after the same manner as a fire-ball.

Stink-BALLS, those which yield a great stench where fired to annoy the enemy. Their preparation is thus: Melt ten pounds of pitch, six of rosin, twenty of salt-petre, eight of gun-powder, and four of colophony; to these add two of charcoal, six of horse-hoofs cut small, three of assa-fœtida, one of stinking faracene, and any other offensive ingredients. The rest as in the former.

Sky-BALLS, those cast on high out of mortars, and which, when arrived at their height, bursting like rockets, afford a spectacle of decoration. Sky-balls are made of a wooden shell, filled with various compositions, particularly that of the stars of rockets. These are sometimes intermixed with crackers and other combustibles, making rains of fire, &c.

Water-BALLS, those which swim and burn a considerable time in the water, and at length burst therein. These are made in a wooden shell, the cavity of which is filled with refined salt-petre, sulphur, saw-dust boiled in water of salt-petre, and dried; to which sometimes other ingredients are added, as iron filings, Greek pitch, amber dust, powdered glass, and camphor. The ingredients are to be ground, mixed up, and moistened with linseed oil, nut oil, olive oil, hempseed oil, or petrol. At the bottom is placed an iron coffin, filled with whole gunpowder, that the ball may at last burst with a greater noise: and, lastly, the ball is, by the addition of lead or otherwise, made of the same specific gravity with water.

Land-BALLS are those which, being thrown out of a mortar, fall to the ground, burn, and burst there. The ingredients are much the same as in the *water-balls*, only the specific gravity is not attended to.

BALL of a Pendulum, the weight at the bottom. In shorter pendulums, this is called the *bob*.

BALL, among the Cornish miners, signifies a tinmine.

BALL, among printers, a kind of wooden tunnel stuffed with wool, contained in a leather cover, which is nailed to the wood, with which the ink is applied on the forms to be wrought off. See *PRINTING*.

Horse-BALLS, among farriers. Horses have a very nice taste; it is therefore proper to give the more disagreeable drugs in the form of balls, and to make drenches of the more palatable. Balls should be of an oval shape, not exceeding the size of a pullet's egg; and should be dipped in sweet oil to make them slip down the easier. Some horses have a strait gullet, which makes them very averse to a ball being thrust down their throats; such horses had better have drenches given them, or their medicines may be mixed with

bran, or in their mashes. See *FARRIERY, passim*.

BALL Vein, in mineralogy, a name given by the miners of Suffex to a sort of iron ore, common there, and wrought to considerable advantage. It yields not any great quantity of metal, but what it has runs freely in the fire; it is usually found in loose masses, not in the form of a stratum, and is often covered with one or more crusts. It generally contains some sparkling particles; and is usually of a circular form in the perfect masses, thickest in the middle, and gradually thinner as it approaches the sides. The ores of Suffex in general are poor, but they require very little trouble in the working; so that a considerable profit is made annually from them.

BALL and Socket is an instrument made of brass, with a perpetual screw, so as to move horizontally, vertically, and obliquely; and is generally used for the managing of surveying and astronomical instruments.

Puff-BALL, the English name of the lycoperdon *. *Martial BALLS*, in pharmacy, are a mixture of filings of iron and of cream of tartar, formed into a solid consistence and form of a ball, which is used to impregnate water or other liquids with iron dissolved by the tartareous acid. To make these balls, one part of filings of iron and two parts powdered cream of tartar are mixed well together, and put into an earthen or iron vessel with some water. This mixture is to be stirred from time to time, till it becomes almost dry; and then it is to receive more water, and to be stirred as before. This treatment is to be continued till it acquires, when nearly dry, somewhat of the consistence and tenacity of softened rosin. Then it is to be rolled up into the form of a ball, which is generally kept tied up in a rag; and when intended to be used, it is to be infused in water, till it gives some colour to that liquid. The infusion of martial balls is tonic, vulnerary, discutient, and aperitive; and is employed both internally and externally *. Iron being soluble in all acids, is attacked in this preparation by the tartareous acid, which reduces it to a kind of neutral salt not crystallizable. This salt would remain liquid, and would form a soluble martial tartar, called *tartarised tincture of Mars*. If proper proportions of filings of iron and cream of tartar be used, and treated long enough for an entire and complete combination, nothing would be obtained but a liquor or magma, which could not be preserved in a solid form, but would be continually moist. Therefore, in the martial ball there is a good deal of the cream of tartar and filings of iron not combined together, by which its solidity is preserved.

Mercurial BALLS, in pharmacy, are an amalgam of mercury and tin, sufficiently solid to be moulded, and to preserve a given form. The method of making them is by adding mercury to melted tin, and pouring the fluid mass into a round hollow mould.—These balls are employed to purify water, in which they are boiled; for which purpose travellers often carry some along with them. Nothing, however, can be more pernicious than such a practice, should the water contain any nitrous acid, which it very often does.

BALLS of Silk-worms and Spiders, are little cases or cones woven of silk, wherein those insects deposit their eggs. Spiders are extremely tender of their balls, which they carry about with them, adhering to the papillæ

* See *Lycoperdon*.

* See *Iron*.

Ballaghan
Ball. a.

about their anus. Grew mentions balls or bags of a species of silk-worms in Virginia, as big as hens eggs, and containing each four aurelias.

Zoologists speak of a sort of balls of hair covered over with a smooth shining coat, or shell, found in the stomachs of oxen, cows, calves, horses, sheep, and goats. See the article *BEZOAR*.

BALLAGHAN, a town of Ireland, in the county of Sligo, and province of Connaught. W. Long. 9. 50. N. Lat. 53. 48.

BALLAN, a town of France in the diocese of Mons, with the title of a marquise, seated on the river Orne. E. Long. 0. 20. N. Lat. 48. 10.

BALLAD, or **BALLET**, a kind of song, adapted to the capacity of the lower class of people; who, being mightily taken with this species of poetry, are thereby not a little influenced in the conduct of their lives. Hence we find, that seditious and designing men never fail to spread ballads among the people, with a view to gain them over to their side.

BALLAST, any heavy matter, as stones, gravel, iron, &c. thrown into the hold of a ship, in order to make her sink a proper depth in the water, that she may be capable of carrying a sufficient quantity of sail without overfetting.

There is often great difference in the proportion of ballast required to prepare ships of equal burden for a voyage; the quantity being always more or less, according to the sharpness or flatness of the ship's bottom, which seamen call the *floor*.

The knowledge of ballasting a ship with propriety, is certainly an article that deserves the attention of the skillful mariner: for although it is known, that ships in general will not carry a sufficient quantity of sail till they are laden so deep that the surface of the water will nearly glance on the extreme breadth amidships, yet there is more than this general knowledge required; since, if she has a great weight of heavy ballast, as lead, iron, &c. in the bottom, it will place the centre of gravity too low in the hold; and although this will enable her to carry a great sail, she will nevertheless sail very heavily, and run the risk of being dismasted by her violent rolling.

To ballast a ship, therefore, is the art of disposing those materials so that the may be duly poised, and maintain a proper equilibrium on the water, so as neither to be too *stiff*, nor too *crank*, qualities equally pernicious: as in the first, although the ship may be fitted to carry a great sail, yet her velocity will not be proportionally increased; whilst her masts are more endangered by her sudden jerks and excessive labouring; and in the last, she will be incapable of carrying sail, without the risk of overfetting.

Stiffness in ballasting, is occasioned by disposing a great quantity of heavy ballast, as lead, iron, &c. in the bottom, which naturally places the centre of gravity very near the keel; and that being the centre about which the vibrations are made, the lower it is placed, the more violent will be the motion of rolling.

Crankness, on the other hand, is occasioned by having too little ballast, or by disposing the ship's lading so as to raise the centre of gravity too high, which also endangers the mast in carrying sail when it blows hard: for when the masts lose their perpendicular height, they strain on the shrouds in the nature of a lever, which in-

creases as the sine of their obliquity; and a ship that loses her masts is in great danger of being lost.

The whole art of ballasting, therefore, consists in placing the centre of the gravity to correspond with the trim and shape of the vessel, so as neither to be too high nor too low; neither too far forward, nor too far aft; and to lade the ship so deep, that the surface of the water may nearly rise to the extreme breadth amidships; and thus she will be enabled to carry a good sail, incline but little, and ply well to the windward.

Ships are said to be *in ballast*, when they have no other loading. Masters of vessels are obliged to declare the quantity of ballast they bear, and to unload it at certain places. They are prohibited unloading their ballast in havens, roads, &c. the neglect of which has ruined many excellent ports.—Ships and vessels taking in ballast in the river Thames, are to pay so much a tun to Trinity-house, Deptford; who shall employ ballastmen, and regulate them; and their lighters to be marked, &c. on pain of 10l.

BALLATOONS, large heavy luggage-boats used for carrying wood by the river from Afracan and the Caspian sea to Moscow. These will carry from 100 to 200 ton, and have from 100 to 120 men employed to row and tow them along.

BALLENDE (Sir John), a Scottish poet, in the reign of James V. of Scotland, was descended from an ancient family in that kingdom. His father, Mr Thomas Ballenden of Auchinoul, was director to the chancery in the year 1540, and clerk register in 1541. Where our poet was educated, we are not informed; but from one of his poems we learn, that in his youth he had some employment at the court of king James V. and that he was in great favour with that prince. Having taken orders, and being created doctor of divinity at the Sorbonne, he was made canon of Ross, and archdeacon of Murray. He likewise obtained the place of clerk register, but was afterwards deprived of that employment by the factions of the times; however, in the succeeding reign, of Mary, he recovered that office, and was one of the lords of session. Being a zealous papist, he, in conjunction with Dr Laing, was extremely assiduous in retarding the progress of the reformation; till at last, finding the opposition too powerful, he quitted Scotland, and went to Rome, where he died in the year 1550. He is generally esteemed one of the best Scottish poets of that age. His works are, 1. *The history and chronicles of Scotland of Hector Boetius* (Boethius), translated by Mr John Ballenden. Edinb. 1536. This is not a mere translation, Ballenden having corrected several mistakes of his author, and made large additions. It is in folio, and black letter. 2. *Cosmography to the history of Scotland*, with a poetical poem. 3. *A description of Albany*. 4. *Translation of Boethius's description of Scotland*. 5. *Epistles to king James V.* Bale says he had seen these letters. 6. Several poems in Carmichael's collection of Scottish poems; besides many others in manuscript, in private libraries in Scotland. 7. *Virtue and eyes*, a poem addressed to king James V.

BALERUS, in ichthyology, the trivial name of a species of cyprinus. See *CYPRINUS*.

BALLET, **BALET**, or **BALETT**, a kind of dramatic poem, representing some fabulous action or subject divided into several entries; wherein several per-

Balladons
B. a.

sons appear, and recite things under the name of some deity, or other illutrious character.

BALLET is more particularly used for a kind of comic dance, consisting of a series of several airs of different kinds of movements, which together represent some subject or action. They are performed chiefly by masks representing sylvans, tritons, nymphs, shepherds, and the like; and consist of three parts, the entry, figure, and the retreat. The word is of Greek origin, formed from βαλλω, *jacere*, to cast, throw, or toss; whence also in writers of the middle age, we find *ballationes* for *saltationes*, dancings; and *ballare*, for *saltare*, to dance.

BALLET, in the English poetry. See BALLAD.

BALLIAGE, or BAILLAGE, in commerce, a small duty paid to the city of London by aliens, and even denizens, for certain commodities exported by them.

BALLICONNEL, a town of Ireland, in the county of Covan and province of Ulster. W. Long. 7. 45. N. Lat. 54. 6.

BALLISHANNON, a large town of Ireland, in the county of Donegal, or Tyrconnel, with a good haven. W. Long. 8. 25. N. Lat. 54. 25.

BALLISTA, a machine used by the ancients for shooting darts; it resembled in some measure our cross-bow. The word is Latin, signifying a cross-bow; and is derived from the Greek, βάλλω, to shoot, or throw.

Vegetius informs us, that the ballista discharged with such rapidity and violence, that nothing could resist their force: and Athenæus adds, that Agiſtratus made one of little more than two feet in length, which shot darts 500 paces.

Plate LVI. fig. 4. represents the ballista used in sieges, according to the chevalier Folard: 2, 2, the base of the ballista; 3, 4, upright beams; 5, 6, transverse beams; 7, 7, the two capitals in the upper transverse beam, (the lower transverse beam has also two similar capitals, which cannot be seen in this transverse figure); 9, 9, two posts or supports for strengthening the transverse beams; 10, 10, two skains of cords fastened to the capitals; 11, 11, two arms inserted between the two strands, or parts of the skains; 12, a cord fastened to the two arms; 13, darts which are shot by the ballista; 14, 14, curves in the upright beams, and in the concavity of which cushions are fastened, in order to break the force of the arms which strike against them with great force when the dart is discharged; 16, the arbor of the machine, in which a groove or canal perfectly straight is formed, and in which the darts are placed in order to their being shot by the ballista; 17, the nut of the trigger; 18, the roll or windlass, about which the cord is wound; 19, an hook, by which the cord is drawn towards the centre and the ballista cocked; 20, a stage or table on which the arbor is in part fastened.

BALLISTEUM, or BALLISTÆA, in antiquity, a military song or dance used on occasions of victory. Vopiscus has preserved the *ballisteum* sung in honour of Aurelian, who, in the Sarmatian war, was said to have killed 48 of the enemy in one day with his own hand. *Mille, mille, mille, mille, mille, mille decollavimus: Unus homo mille, mille, mille, mille decollavit; mille, mille, mille vivat, qui mille, mille occidit. Tantum vini habet nemo, quantum fudit sanguinis.* The same writer subjoins another popular song of the same kind: *Mille Francos, mille Sarmatas, semel occidimus;*

mille, mille, mille, mille, mille Perſas quærimus. It took the denomination *ballisteum* from the Greek βάλλω, *jacio*, or *jacto*, to cast or toss, on account of the motions used in this dance, which was attended with great elevations and swingings of the hands. The *ballistea* were a kind of popular ballads, composed by poets of the lower class, without much regard to the laws of metre.

BALLOON, or BALLON, in a general sense, signifies any spherical hollow body, of whatever matter it be composed, or for whatever purposes it be designed. Thus, with chemists, balloon denotes a round short-necked vessel, used to receive what is distilled by means of fire; in architecture, a round globe on the top of a pillar; and among engineers, a kind of bomb made of pasteboard, and played off in fire-works, either in the air or on the water, in imitation of a real bomb.

BALLOON also denotes a kind of game something resembling tennis. The balloon is played in the open field, with a great round ball of double leather blown up with wind, and thus driven to and fro with the strength of a man's arm, fortified with a brace of wood.

BALLOON, or BALLOEN, is more particularly used, among voyagers, for the state-barges of Siam. The balloons are a kind of brigantine, managed with oars, of very odd figures, as serpents, sea-horses, &c. but, by their sharpness and number of oars, of incredible swiftness. The balloons are said to be made of a single piece of timber, of uncommon length; they are raised high, and much decorated with carving at head and stern: some are gilt over, and carry 120 or even 150 rowers on each side. The oars are either plated over with silver, or gilt, or radiated with gold; and the dome or canopy in the middle, where the company is placed, is ornamented with some rich stuff, and furnished with a ballustrade of ivory, or other costly matter, enriched with gilding. The edges of the balloon just touch the water, but the extremities rise with a sweep to a great height. Some are adorned with variety of figures, made of pieces of mother of pearl inlaid: the richer sort, instead of a dome, carry a kind of steeple in the middle; so that, considering the slenderness of the vessel, which is usually 100 or 120 feet long, and scarce six broad, the height of the two ends, and of the steeple, with the load of decorations, it is a kind of miracle they are not overfet.

BALLOON, in the French paper-trade, is a term for a quantity of paper, containing 24 reams.

BALLOON, BALLON, or BALLOT, in the French glass-trade, signifies a certain quantity of glass-plates, smaller or greater, according to their quality. The balloon of white glass contains 25 bundles, of six plates per bundle; but the balloon of coloured glass is only of 12½ bundles, and of three plates to a bundle.

BALLOTA, WHITE MOREHOUND; a genus of the gymnospetria order, belonging to the didynamia class of plants. It is a common weed growing on the sides of banks in moist parts of England, as also in walk-places near towns and villages in Scotland; so is seldom admitted into gardens. The flowers grow in whorls, upon branched peduncles, and lean on one side of the stalk; they are commonly of a dull red colour, but sometimes white. It was formerly used in hysterical cases, but is now fallen into disuse. The Swedes reckon it almost an universal remedy in the diseases of their

Ballotade
Balam.

their cattle. Horses, cows, sheep, and goats, refuse to eat it.

BALLOTADE, in the menage, the leap of a horse between two pillars, or upon a straight line, made with justness of time, with the aid of the hand, and the calves of the legs; and in such a manner, that when his fore-feet are in the air, he shews nothing but the shoes of his hinder-feet without jerking out.

BALLOTING, a method of voting at elections, &c. by means of little balls usually of different colours, by the French called *ballotes*; which are put into a box privately.

BALLS, or **BALLETS**, in heraldry, a frequent bearing in coats of arms, usually denominated, according to their colours, bezants, plates, hurts, &c.

BALLUSTER, a small kind of pillar used for ballustrades.

BALLUSTRADE, a series or row of ballusters, joined by a rail; serving as well for a rest to the elbows, as for a fence or inclosure to balconies, altars, staircases, &c. See **ARCHITECTURE**, n° 79, 80.

BALM, in botany. See **MELISSA**.

BALM, or **BALSAM**. See **BALSAM**.

BALM of Gilead. See **OPOBALSAM**.

BALNAVES (Henry), a Scottish protestant divine, born in the shire of Fife, in the reign of James V. and educated at the university of St Andrew's. He went afterwards to France in order to finish his studies; and, returning to Scotland, was admitted into the family of the earl of Arran, who at that time governed the kingdom: but in the year 1542 the earl dismissed him for having embraced the Protestant religion. In 1564, he joined, says Mackenzie, the murderers of cardinal Beaton; for which he was declared a traitor, and excommunicated. Whilst that party were besieged in the castle of St Andrew's, they sent Balnaves to England, who returned with a considerable supply of provisions and money: but, being at last obliged to surrender to the French, he was sent with the rest of the garrison to France. He returned to Scotland about the year 1559; and, having joined the congregation, he was appointed one of the commissioners to treat with the duke of Norfolk on the part of queen Elizabeth. In 1563 he was made one of the lords of session, and appointed by the general assembly, with other learned men, to revise the Book of Discipline. Knox, his cotemporary and fellow-labourer, gives him the character of a very learned and pious divine. He died at Edinburgh in the year 1575. He wrote, 1. *A treatise concerning justification*. Edinb. 1550, 8vo. 2. *A catechism, or confession of faith*. Edinb. 1584, 8vo.

BALNEUM, a term used by chemists to signify a vessel filled with some matter, as sand, water, or the like, in which another is placed that requires a more gentle heat than the naked fire *

See Chemi-
y, n° 79.
See Ta-
ra.

BALSA, an ancient town of Lusitania in the Ager Cænesis; now *Tavira*, capital of Algarva †.

BALSAM, or **NATIVE BALSAM**, an oily, resinous, liquid substance, flowing either spontaneously, or by means of incision, from certain plants. There are a great variety of balsams, generally denominated from the substances from which they are obtained *

See Chemi-
y, n° 498.

BALSAM of Copaiba.

BALSAM of Peru.

BALSAM of Tolu.

} See **MATERIA MEDICA**, 99,
100, 101.

Balsamics
Baluze.

Prepared BALSAM; as *Locatelli's*, the *Traumatic*, &c. See **PHARMACY**, n° 432, 890, &c.

BALSAMICS. *Balsamica* is a Latin word which signifies *mitigating*. The term *balsamic* is a very lax one; it includes medicines of very different qualities, as emollients, detergents, restoratives, &c. but in medicines of all these kinds there seems to be this requisite in them, viz. that they be soft, yielding, and adhesive, also that by their smallness they have a ready disposition to motion. Medicines of this tribe are generally required for complaints whose seat is in the viscera; and as they cannot be conveyed there but by the common road of the circulation, it follows that no great effects can be expected from them but by their long continuation. Hoffman calls by the name of *balsamics* those medicines which are hot and acrid, also the natural balsams, gums, &c. by which the vital heat is increased.

Motherby's
Med. Dict.

BALSORA. See **BASSORA**.

BALTAGI, among the Turks; porters, and hewers of wood, in the court of the grand signior; who also mount on horseback, when the emperor rides out. Part of them also, who, for that purpose, must be castrated, keep watch at the gates of the first and second courts of the seraglio. These last are called *capigi*, and their commander *capigi pascha*.

BALTIC SEA, a great gulph between Germany and Poland; from which run several other gulphs, particularly those of Bothnia, Finland, Livonia, and Dantzick. It is remarkable that this sea neither ebbs nor flows, and there is always a current sets through the found into the ocean. It is generally frozen over three or four months in the year. Yellow amber is found in plenty on this coast.

BALTIMORE, a town of Ireland in the county of Corke and province of Munster, with the title of a barony. It is seated on a headland which runs into the sea, five miles north-east of Cape Clear. W. Long. 9. 10. N. Lat. 51. 15.

BALTZAR (Thomas), a native of Lubec, was an eminent musical composer, and esteemed the finest performer on the violin of his time. He came into England in the year 1658, and lived about two years in the house of Sir Anthony Cope of Hanwell in Oxfordshire. He was the great competitor of Davis Mell, who, though a clock-maker by trade, was, till Baltzar came hither, allowed to be the finest performer on the violin in England; and after his arrival he divided with him the public applause, it being agreed that Mell excelled in the fineness of his tone and the sweetness of his manner, and Baltzar in the power of execution and command of the instrument. Moreover, it is said of the latter, that he first taught the English the practice of shifting, and the use of the upper part of the finger-board. Baltzar was given to intemperance, and is said to have shortened his days by excessive drinking: he was buried in Westminster-abbey on the 27th day of July 1663.

BALUCLAVO, or **JAMBOL**, a sea-port town of Crimea on the Black Sea, where they build ships for the Grand Signior. E. Long. 35. 15. N. Lat. 44. 50.

BALUZE (Stephen), a French writer, born in 1631, and sometime librarian to M. Colbert. In 1693 he obtained a pension, with the post of director of the royal college, for writing the lives of the popes of Avignon; both which advantages he soon lost in the fluctuation of court-parties. M. Baluze is much more

Balyur,
Balzac.

noted for collecting ancient MSS. and illustrating them by notes, than famed for his own compositions.

BALYUR, or **BALIUR**, a sea-port of Africa in the kingdom of Dancali, about 14 hours journey west from Babel-Mandel. It is remarkable only for being the landing place of the Abyssinian Patriarch Alphonsus Mendez, with his Jesuits and Portuguese, on April 3^d 1724. The king who had received orders from the Abyssinian emperor to give them a proper reception, dispatched his son to meet them and conduct them to him. The royal palace they found to consist of about half a dozen of tents, and a score of huts, fenced about with a thorn hedge, and shaded by some wild kinds of trees. Near the palace was a river, which was then quite dried up, and no water to be found but what was digged for in the channel. The hall of audience was only a large tent about a musket-shot from the rest. At the upper end was a kind of throne made of stones and clay, covered with a carpet, and two velvet cushions. At the other end was his majesty's horse, with the saddle and other accoutrements hanging on one side; it being the custom of this country for the master and horse to lie together, whether king or subject. Around the hall were about 50 young men sitting cross-legged; and when the Portuguese ambassadors were admitted, they were made to sit down in the same posture. Soon after came the king preceded by some of his domestics, one having an earthen pitcher full of hydromel, another a cup made of porcelain, a third carrying a cocoa shell full of tobacco, and a fourth bringing a silver tobacco-pipe with some fire. Next to them was the king, dressed in a light silk stuff, having on his head a turban, from the rims of which hung a parcel of rings nicely wrought, which dangled before his face. He had in his hand a short kind of javelin, and was followed by all the chief officers of his court and household. The respect paid him at his coming in was by standing on their feet, and squatting down again twice, after which they went forward to kiss his hand.

BALZAC (John Lewis Guez de), born at Angoulême in 1595. Voltaire allows him the merit of having given numbers and harmony to the French prose, but censures his style as somewhat bombast. The critics of his own time gave him no little disquiet; and he gave them no little advantage over him by his fallies of vanity, and some particular propositions which were a little dangerous. Mr Balzac, getting rid of these disputes by his moderation, settled at his country-seat; refined his style and genius; and got by his letters and other writings which he published from time to time, the reputation of being the first writer in France. He was at length drawn from his retirement by the hopes of making his fortune under cardinal Richieu, who had formerly courted his friendship; but in a few years he retired again, disgusted with the slavish dependence of a court life. All he obtained from the court was a pension of 2000 livres, with the titles of counsellor of state and historiographer of France. He died in 1654; and was buried in the hospital of Notre Dame des Anges, to which he bequeathed 12,000 livres. He left an estate of 100 franks *per ann.* for a gold medal to be bestowed every two years for the best discourse on some moral subject.—Besides his letters, he wrote a work called *Oeuvres Diverses*, i. e. on various

subjects; The Prince; The Christian Socrates, &c. and many other pieces; of all of which have been published in two volumes folio.

BAMBA, a province of the kingdom of Congo in Africa.—It is situated between the rivers of Ambrisi and Loze; the last of which parts it from Pemba on the east, and the Ambrisi from the province of Sogno on the north. Along the sea-coasts it extends itself northward to the river Lelunda; and on the south to that of Danda, which parts it from the kingdom of Angola. The governors of this province bear the title of *dukes*, and are always some of the princes of the royal family. They are as despotic and arbitrary as if they were really kings, notwithstanding the care and pains their monarchs have taken to keep them within due bounds. The soil of this province is very fertile; and would produce all the necessaries of life in great plenty, were the inhabitants but industrious in its cultivation. The sea-coasts produce a vast quantity of salt, which could be purified with little trouble, and would yield an extraordinary revenue if the duties were duly paid; but these the governors find means to sink mostly into their own coffers.—Here is also the fishery of the zimbi, or little sea-snail, whose shell is the current coin, not only in this and the neighbouring kingdom, but also in the most distant parts of Africa. Here are also said to be mines of gold, silver, quicksilver, copper, tin, and iron; but none except the iron mines are allowed to be worked.

BAMBERG, a large handsome town of Franconia in Germany, and capital of a bishopric of the same name. It was formerly imperial, but is now subject to the bishop. The country about it produces plenty of corn, fruits, and liquorice. It has an university, founded in 1585; and is situated at the confluence of the rivers Main and Reidnitz. E. Long. 10. 15. N. Lat. 50. 10.

BAMBERG, a town of Bohemia, situated at the foot of a mountain. E. Long. 16. 50. N. Lat. 49. 53.

BAMBOCCIO. See *LAFER*.

BAMBOE, in botany, the trivial name of a species of arundo *.—It is a plant which multiplies very much by its root, from which springs a ramous or branchy tuft, after the manner of the European reeds. The Indian bamboo is the largest kind of cane that is known. It is of an extraordinary height and bigness, when it bears its blossom: each shoot or cane is often, towards the bottom, of the bigness of a man's thigh, and decreases gradually to the top, where it bears a blossom or flower, like our reeds, in their proper season. With these canes of bamboe the Indians build their houses, and make all sorts of furniture, in a very ingenious manner. The wood of these canes is so hard and strong, that they serve very well to make piles for supporting their little houses, built over rivers, which have a gentle course, as if it were over slanting waters. They also make with this wood all sorts of utensils for their kitchens and tables. The thickest bamboes serve to make the sticks and poles with which the slaves or other persons carry those sorts of litters which are called *palanquins*, and are so common in use and so convenient in all the east. They likewise make of that wood a kind of pails, in which the water keeps extremely cool. The walking-canes which we see in Europe, are the first and smallest shoots of the bamboes.—The Malays,

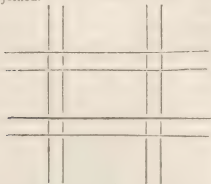
Bamba
Bamboe.

* See *Arundo*.

bamboe,
bambock.

lays, and those Chinese who are dispersed in the Moluccas and Sunda isles, use the young small shoots of the bamboes preserved in vinegar after their manner, with very strong peppered ingredients. This they call *achiar bamboe*. For they give the name of *achiar* to all that is preserved in vinegar; and, to distinguish it, they add to that name of *achiar* that of the thing preserved *.—Two pieces of bamboe of a certain bigness, being rubbed hard against each other after a certain manner, will produce fire; and, when the Indians cannot get any by other means, they obtain it that way.

BAMBOE-HABIT; a Chinese contrivance by which a person who does not know how to swim may easily keep himself above water. The following account of it is from a letter to the author of the *Seaman's Preservative*. "In the year 1730, I was passenger in a ship from Batavia to China, burden about 400 tons, called the *Pridae*, Francisco Xavier commander, freighted by English, Chinese, and Portuguese. Near the coast of China we met one of those storms called a *Typhoon*, (*Tau fong*) or a great wind, which carried away all our masts, bowsprit, and rudder; and in our hold we had six feet of water, expecting every moment the ship would founder.—We consequently were consulting our preservation: the English and Portuguese stood in their shirts only, ready to be thrown off; but the Chinese merchants came upon deck, not in a cork-jacket, but I will call it a *bamboe-habit*, which had lain ready in their chests against such dangers; and it was thus constructed; four bamboes, two before, and two behind their bodies, were placed horizontally, and projected about 23 inches. These were crossed on each side by two others, and the whole properly secured, leaving a space for their body; so that they had only to put it over their heads, and tie the same securely, which was done in two minutes, and we were satisfied they could not possibly sink." The shape is here subjoined.



BAMBUCK, a country of Africa, of which the following account is given by the Abbe Raynal, on the credit of a modern traveller whom he does not name. "In the interior parts of Africa, under the 12th or 13th degree of north latitude, there is, says a modern traveller, a pretty large country, known by the name of *Bambuck*. It is not subject to a particular king; but governed by village lords, called *farims*. These hereditary and independent chiefs are all obliged to unite for the defence of the state, when it is either attacked as a community, or only in one of its branches.

"The territory of this aristocratical state is dry and barren. It produces neither maize, rice, nor pulse.

Bambuck,
Bamff.

The insupportable heat it is subject to, proceeds in part from its being surrounded by high mountains, which prevent the wind from refreshing the air. The climate is as unwholesome as it is disagreeable; vapours, which continually issue from the bowels of a soil replete with minerals, render this country unfit to live in, especially to strangers.

"It is gold that hath made this miserable country an object worthy of notice: gold, which in the eyes of the covetous man seems to compensate for all the evils of nature, tho' in reality it increases them all. This metal is so common in this country, that it is found almost indiscriminately every where. To obtain it, sometimes it is sufficient to scrape the surface of the earth, which is clayish, light, and mixed with sand. When the mine is very rich, it is digged only to the depth of a few feet, and never deeper; though it has been observed, that the lower it was digged, the more gold the soil afforded. The miners are too indolent to pursue a toil which constantly becomes more tedious, and too ignorant to perceive the inconveniences it would be attended with. Their negligence and their folly are in this instance so extraordinary, that in washing the gold, in order to separate it from the earth, they only preserve the larger pieces: the light parts pass away with the water, which flows down an inclined plain.

"The inhabitants of Bambuck do not work these mines at all times, nor are they at liberty to do it when they please. They are obliged to wait till private or public wants determine the farims to grant this permission. When it is proclaimed, all who are able to avail themselves of this advantage meet at the appointed place. When their work is finished, a division is made. Half of the gold goes to the lord, and the remainder is equally distributed among the labourers. Those who want gold at any other time than that of the general digging, search for it in the beds of the rivers, where it is very common.

"The French and English have successively been desirous of appropriating to themselves these real or imaginary riches. Some thought they could reach this country by the Niger, others by the *S.iam*. Far from having succeeded in their attempts of becoming masters of this country, they have not yet ascertained its existence. The unsuccessfulness of past efforts hath redoubled the activity of languine minds: sensible and judicious merchants have chosen to limit themselves to a commerce much more important, which is that of slaves."

BAMFF, a shire of Scotland, comprehending part of Buchan, with the countries of Strathdovern, Bony, Enzie, Strathaven, and Balvenie, extends 32 miles from east to west, and 13 in breadth from north to south. On the south, it is separated from part of Buchan by the river Ugie; on the east, it is watered by the Dovern and the German ocean; on the west, it is bounded by the Spey and the country of Murray; on the south-west, it borders on Badenoch and the Braes of Mar; and on the north, it is confined by the Murray Frith. The face of the country is agreeably diversified with hill and dale, not without woods, well watered with rivers, and exhibiting many seats and plantations. The air is pure and keen, the climate healthy, and the soil fertile, producing plentiful crops

Bamff,
Bamiyan.

of corn. The country of Buchan, extending northwards from the river Ugie to the sea, and westward as far as Dovern, comprehending a tract of 20 miles in length, and nine in breadth, is more free from hills and mountains than any other country of the same extent in the kingdom of Scotland. It is inhabited chiefly by Lowlanders, and gives the title of *Earl* to the chief of the family of Erlikine. The country of Bamff abounds with the necessaries and comforts of life. The pasture-grounds yield sheep, cattle, and horses: the arable lands produce plenty of corn; while the rivers and sea supply great quantities of fish. Various minerals have been found in different parts of the shire; and a piece of amber, as large as a horse, was once cast ashore on the beach. In the mountainous district of Balvenie, on the western side of the shire, watered by the Spey, there is a noted rock, which produces hones and whet-stones sufficient to supply the whole island. Here are also veins of allum-stone, and springs of allum-water. Strathallan, another district to the north-east of Balvenie, abounds with such plenty of limestone, that the inhabitants use it as common stone in building their houses; and moreover burn a great quantity of into lime, which they sell to good advantage in the village of Keith, on the river Dovern. Along this whole coast, there are ancient Danish monuments, such as cairns, tumuli, and huge stones standing erect. In Strathaven, a hilly country, lying along the limpid river Avon, which falls into the Spey, we meet with Gordon castle, belonging to the duke of Gordon, the most princely edifice in the north of Scotland, consisting of noble apartments, magnificently furnished, and environed with fine gardens and parks, well stored with fallow-deer. The same nobleman possesses several other seats in this country.

BAMFF, the capital of the shire of that name in Scotland. It is seated at the mouth of the river Dovern, but has no harbour, and consequently little trade except for corn and salmon. W. Long. 2. 5. N. Lat. 57. 40.

BAMIYAN, a city of Asia, situated in the province of Zablestan, 10 days journey from Balkh, and eight from G.zna. It is remarkable only for its dreadful catastrophe when taken by Jenghiz Khan in 1221. At that time the city belonged to sultan Jalalodin, the last of the famous Mahmud Gazni's race. Jenghiz Khan was at that time about to attack Gazna, that prince's capital; but was stopped by the garrison of Gazna, which he had hoped would give him no trouble. In this, however, he was disappointed. The people had for a long time expected an attack; and had therefore ruined the country for five or six leagues round, while the peasants had carried away the stones, and every thing that could be of use to the besiegers. Accordingly, Jenghiz Khan having erected wooden towers, and planted his engines upon them, was in a short time obliged to give over his attacks till millstones and other materials could be brought from a great distance. The walls of the city were very strong, so that the engines of the Moguls made but little impression; and the garrison making frequent and furious sallies cut off whole squadrons of their enemies, and frequently overthrew their towers and engines. This exceedingly chagrined Jenghiz Khan; who one day returning from a fruitless attack, and hearing of the defeat of

one of his generals by Jalalodin, swore to be revenged on Bamiyan. This fury cost the life of one of his grandchildren; who exposing himself too much, to please his grandfather, was slain with an arrow.—At last, however, by the numberless multitude of the Moguls, who continued the attacks without intermission, the city was taken, and after its walls had been ruined in many places, and the bravest soldiers and officers of the garrison slain in its defence. The mother of the young prince who had been killed, entering with the troops, and more deserving the name of a fiend than a woman, caused the throats of all the inhabitants to be cut, without excepting one. She even gave orders to rip up the bellies of all the women with child, that not an infant might be left alive. In short, to gratify the rage of this inhuman monster, the buildings were all levelled with the ground; the cattle, and every living creature, destroyed; infomuch that the hardened Moguls themselves gave this place the name of *Maubalig*, which in their language signifies the *unfortunate city*. A strong castle has since been built out of its ruins.

BAMPTON, a town of Devonshire, situated in a bottom surrounded with high hills. W. Long. 4. 25. N. Lat. 51. 5.

BAN, or **BANS**. See **BANN**.

BAN, in commerce, a sort of smooth fine muslin, which the English import from the East Indies. The piece is almost a yard broad, and runs about 20 yards and a half.

BANANA-TREE, a species of the musa or plantain. See **PLANTAIN**.

BANARES, or **BENARES**, a handsome town of Asia, in the dominions of the Great Mogul, greatly celebrated for its sanctity, and being the university of the Indian bramins. It is seated on the north side of the river Ganges, in E. Long. 82. 30. N. Lat. 26. 20.

BANBURY, a town of Oxfordshire in England, situated on the river Charwell, in W. Long. 1. 20. N. Lat. 52. 0.

BANC, or **BENCA**, in law, denotes a tribunal, or judgment-seat: hence *king's banc* is the same with the *court of king's-bench*, and *common banc* with that of *common pleas* *.

BANCA, an island of Asia, in the East Indies, between Sumatra and Borneo; from the first of which it is separated only by a narrow channel. E. Lon. 105. 10. N. Lat. 13. 25.

BANCALIS, a sea-port town on the east coast of the island of Sumatra, where the Dutch have a settlement. E. Long. 99. 7. N. Lat. 1. 5.

BANCO, an Italian word which signifies *bank*. It is commonly used to signify the *bank of Venice*.

BANCOCK, a town of the kingdom of Siam in Asia, with a fort, which was once in the possession of the French, but they were driven from it in 1688. E. Long. 101. 5. N. Lat. 13. 25.

BAND, in a general sense, some small narrow ligament, wherewith any thing is bound, tied, or fastened.

BAND, in architecture, a general name for any flat, low member, or moulding, that is broad, but not very deep.

BAND of Soldiers, in military affairs, those who fight under the same flag or ensign.

BAND of Pensioners, a company of 120 gentlemen, who

Bampton
Band.* See King's
Bench and
Common
Pleas.

Band
||
bandelet.

who receive a yearly allowance of 100*l.* for attending on his majesty on solemn occasions.

BAND is also the denomination of a military order in Spain, instituted by Alphonfus XI. king of Castile, for the younger sons of the nobility; who, before their admission, must serve 10 years, at least, either in the army, or at court; and are bound to take up arms for the catholic faith against the infidels.

BAND, in furgery. See BANDAGE.

BANDA ISLANDS, the general name of five islands in the East Indies, belonging to the Dutch. Two of them are uncultivated, and almost entirely uninhabited; the other three claim the distinction of being the only islands in the world that produce the nutmeg.

If we except this valuable spice, the islands of Banda, like all the Moluccas, are barren to a dreadful degree. What they produce in superfluities they want in necessities. The land will not bring forth any kind of corn; and the pith of the fago serves the natives of the country instead of bread.

As this food is not sufficient for the Europeans who settle in the Moluccas, they are allowed to fetch provisions from Java, Macassar, or the extremely fertile island of Bali. The company itself carries some merchandize to Banda.

This is the only settlement in the East Indies that can be considered as an European colony; because it is the only one where the Europeans are proprietors of lands. The company finding that the inhabitants of Banda were savage, cruel, and treacherous, because they were impatient under their yoke, resolved to exterminate them. Their possessions were divided among the white people, who got slaves from some of the neighbouring islands to cultivate the lands. These white people are for the most part Creoles, or malecontents who have quitted the service of the company. In the small island of Rosinging, there are likewise several banditti, whom the laws have branded with disgrace; and young men of abandoned principles, whose families wanted to get rid of them: so that Banda is called the *island of correction*. The climate is so unhealthy, that these unhappy men live but a short time. It is on account of the loss of so great a number of hands, that attempts have been made to transfer the culture of the nutmeg to Amboyna; and the company were likewise probably influenced by two other strong motives of interest, as their trade could be carried on with less expense and greater safety. But the experiments that have been made have proved unsuccessful, and matters remain in their former state.

BANDAGE, in furgery, a fillet, roller, or swath, used in dressing and binding up wounds, restraining dangerous hæmorrhages, and in joining fractured and dislocated bones.

BANDALEER, or BANDELEER, in military affairs, a large leathern belt, thrown over the right shoulder, and hanging under the left arm; worn by the ancient musqueteers, both for the sustaining of their fire-arms, and for the carriage of their musquet-charges, which being put up in little wooden cases, coated with leather, were hung, to the number of twelve, to each bandaleer.

BANDELET, or BANDLET, in architecture, any little band, or flat moulding, as that which crowns the Doric architrave.

BANDER-CONGO, a small sea-port town in Asia, seated on the Persian Gulph. E. Long. 54. 10. N. Lat. 19. 0.

BANDERET, a general, or one of the commanders in chief of the forces.—This appellation is given to the principal commanders of the troops of the canton of Bern in Switzerland, where there are four banderets, who command all the forces of that canton.

BANDEROLL, a little flag, in form of a guidon, extended more in length than in breadth, used to be hung out on the masts of vessels, &c.

BANDITTI, persons proscribed, or, as we call it, *outlawed*; sometimes denominated *banniti*, or *foris-banniti*.

BANDITTI, or BANDITI, is also a denomination given to highwaymen, or robbers, who infest the roads in troops, especially in Italy and France. The term is also applied to a sort of freebooters, who pillage in the islands of the Archipelago.

BANDORA, the capital of the island of Salfet, on the west coast of the peninsula on this side the Ganges. It is separated from the island of Bombay by a narrow channel, and subject to the Portuguese. E. Lon. 72. 30. N. Lat. 19. 0.

BANDORA is also the name of an ancient musical instrument, with strings, resembling a lute. See LUTE.

BANDY-LEGGED Persons are such whose feet are distorted, turning either inward or outward on either side.

BANE, (from the Sax. *bana*, a murderer), signifies destruction or overthrow. Thus, "I will be the *bane* of such a man," is a common saying. So, when a person receives a mortal injury by any thing, we say, "it was his *bane*;" and he who is the cause of another man's death, is said to be *le bane*, i. e. a malefactor.

BANGHIR, a town of Ireland, in king's county in the province of Leinster, seated on the river Shannon. W. Long. 8. 5. N. Lat. 53. 10.

BANGLE EARS, an imperfection in a horse, remedied in the following manner. Place his ears in such a manner as you would have them stand; bind them with two little boards so fast that they cannot stir, and then clip away all the empty wrinkled skin close by the head.

BANGIUS (Thomas), a Danish divine, and an elegant Latin writer on the origin of languages and a variety of other subjects. He died in 1661.

BANGOR, an episcopal city of Caernarvonshire in North Wales. In ancient times it was so considerable, that it was called *Bangor the Great*, and defended by a strong castle; but it is now a very mean place: the principal buildings being the cathedral, the bishop's palace, and a free school. W. Long. 4. 10. N. Lat. 53. 20.

BANGOR, a town of Ireland, in the county of Down and province of Ulster. It is seated on the fourth shore of the bay of Carrick Fergus, opposite to the town of that name; and sends two members to parliament. W. Long. 6. N. Lat. 54. 42.

BANGUE, a species of opiate, in great use throughout the east, for drowning cares and inspiring joy.—This by the Persians is called *bang*; by the Arabs, *essar*, corruptly *asseral*, and *assarth*; by the Turks, *bengitic*, and vulgarly called *maffack*; by the European naturalists, *bangue* or *bange*.—It is the leaf of a kind

Bander-
congo
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Bangué.

kind of wild hemp, growing in the countries of the Levant; it differs little, either as to leaf or seed, from our hemp, except in size. Some have mistaken it for a species of *althæa*.

There are divers manners of preparing it, in different countries. Olearius describes the method used in Persia. Mr Sale tells us, that, among the Arabs, the leaf is made into pills, or conserves. But the most distinct account is that given by Alexander Maurocordato confessor and physician of the Ottoman Porte, in a letter to Weddellius. According to this author, bangle is made of the leaves of wild hemp, dried in the shade, then ground to powder; put into a pot wherein butter has been kept; set in an oven till it begin to torify: then taken out, and pulverized again; thus to be used occasionally, as much at a time as will lie on the point of a knife. Such is the Turkish bangle.—The effects of this drug are, To confound the understanding; set the imagination loose; induce a kind of folly, and forgetfulness, wherein all cares are left, and joy and gaiety take place thereof. Bangle in reality, is a succedaneum to wine, and obtains in those countries where Mahometanism is established; which prohibiting the use of that liquor absolutely, the poor muselmans are forced to have recourse to succedanea, to rouse their spirits. The principal are *opium* and this bangle. As to the opinion among Europeans, that the Turks prepare themselves for battle by a dose of bangle, which rouses their courage, and drives them, with eagerness, to certain death; Dr Maurocordato assures us that it is a popular error: the Turks think they are then going assuredly to receive the crown of martyrdom; and would not, for any consideration, lose the merit of it, which they would do, by eating the bangle, as being held unlawful by their apostle, among other things which intoxicate.

BANIALUCH, or **BAGNALUCH**, a city of European Turkey, the capital of Bosnia, upon the frontiers of Dalmatia, near the river Setina. E. Long. 18. 20. N. Lat. 44. 20.

BANIANS, a religious sect in the empire of the Mogul, who believe a metempsychosis; and will therefore eat no living creature, nor kill even noxious animals, but endeavour to release them when in the hands of others.—The name of *Banian* is used with some diversity, which has occasioned much confusion, and many mistakes. Sometimes it is taken in a less proper sense, and extended to all the idolaters of India, as contradicting distinguished from the Mahometans: in which sense, banians include the bramins and other casts. *Banians*, in a more proper sense, is restrained to a peculiar cast, or tribe, of Indians, whose office or profession is trade and merchandize: in which sense, *banians* stand contradicting distinguished from *bramins*, *cutterys*, and *wysse*, the three other casts into which the Indians are divided. The four casts are absolutely separate as to occupation, relation, marriage, &c. though all of the same religion; which is more properly denominated the religion of the bramins, who make the ecclesiastical tribe, than of the *banians*, who make the mercantile. The proper *banians* are called, in the *shaster*, or book of their law, by the name of *shuddery*; under which are comprehended all who live after the manner of merchants, or that deal and transact for others, as brokers; exclusive of the mechanics, or artificers, who

make another cast, called *wysse*. These *banians* have no peculiar sect or religion, unless it be, that two of the eight general precepts given by their legislator Breamaw to the Indian nation, are, on account of the profession of the *banians*, supposed more immediately to relate to them, viz. those which enjoin veracity in their words and dealings, and avoiding all practices of circumvention in buying and selling.—Some of the *banians*, quitting their possession, and retiring from the world, commence religious, assume a peculiar habit, and devote themselves more immediately to God, under the denomination of *vertas*. These, tho' they do not hereby change their cast, are commonly reckoned as bramins of a more devout kind; much as monks in the Romish church, though frequently not in orders, are reputed as a more sacred order than the regular clergy. The name *banian* imports as much, in the bramin language (wherein their law is written), as a people innocent and harmless; void of all guile; and so gentle, that they cannot endure to see even a fly or worm injured; and who, when struck, will patiently bear it, without resisting or returning the blow.—Their mien and appearance is described by Lord†, in terms a little precise, but very significant: "A people presented themselves to my eyes clothed in linen garments, somewhat low descending, of a gesture and garb, as I may say, maidenly and well nigh effeminate, of a countenance shy and somewhat estranged."—Gemelli Careri divides the *banians* into 22 tribes, all distinct, and not allowed to marry with each other. Lord assures us they are divided into 82 casts or tribes, correspondent to the casts or divisions of the bramins or priests, under whose discipline they are, as to religious matters; though the generality of the *banians* choose to be under the direction of the two bramin tribes, the *Vishnagranauagers* and *Vulnagranauagers*.

The *banians* are the great factors, by whom most of the trade of India is managed; in this respect, comparable to the Jews and Armenians, and not behind either, in point of skill and experience, in whatever relates to commerce. Nothing is bought but by their mediation. They seem to claim a kind of *jus divinum* to the administration of the traffic of the nation, grounded on their sacred books, as the bramins do to that of religion. They are dispersed, for this purpose, through all parts of Asia, and abound in Persia, particularly at Isfahan and Gombroon where many of them are extremely rich, yet not above acting as brokers, where a penny is to be got. The chief agents of the English, Dutch, and French East India companies, are of this nation: they are faithful, and are generally trusted with the cash of those companies in their keeping. They act also as bankers, and can give bills of exchange for most cities in the East Indies. Their form of contract in buying and selling, is remarkable; being done without words, in the profoundest silence, only by touching each other's fingers: the buyer loosening his *panierin*, or girdle, spreads it on his knee, and both he and the seller having their hands underneath, by the intercourse of the fingers, mark the price of pounds, shillings, &c. demanded, offered, and at length agreed on. When the seller takes the buyer's whole hand, it denotes a thousand; and, as many times as he squeezes it, as many thousand pagods, or roupes, according to the species

Banier
Banisteria.

in question, are demanded: when he only takes the five fingers, it denotes five hundred; and when only one, one hundred: taking only half a finger, to the second joint, denotes fifty; the small end of the finger, to the first joint, stands for ten.

BANIER (Anthony), licentiate in laws, member of the academy of inscriptions and belles lettres, and ecclesiastic of the diocese of Clermont in Auvergne; died in November 1741, aged 69. He is principally celebrated for his translation of the *Metamorphoses* of Ovid, with historical remarks and explanations; which was published in 1732, at Amsterdam, in folio, finely ornamented with copperplates, by Picart; and reprinted at Paris 1738, in two vols 4to: and for his *Mythology, or fables of the ancients explained by history*; a work full of the most important information, which was translated into English, and printed at London in 1741, in 4 vols 8vo.

BANISHMENT, exile, among us is of two kinds: the one voluntary, and upon oath; the other by compulsion, for some offence or crime*. The former properly called *abjuration*, is now ceased; the latter is chiefly enjoined by judgment of parliament. Yet outlawry and transportation may also be considered as species of exile†.

See Exile;
to the article Rights,
p. ii. par. 4.

See Abjuration and
Transportation.

BANISTER (John), a physician and surgeon in the reign of queen Elizabeth, was educated at Oxford, where, says Anthony Wood, he studied logicals for a time; but afterwards applied himself solely to physic and surgery. In 1573 he took the degree of bachelor of physic; and, obtaining a licence from the university to practise, settled at Nottingham, where he lived many years in great repute. When or where he died, is not known. There was a long poetical memorial of him in the church of St Olave, Silver-street, London, which is preserved by Stow. He was author of, 1. *A needful, new, and necessary treatise of chirurgery, briefly comprehending the general and particular curation of ulcers*. Lond. 1575, 8vo. 2. *Certain experiments*, of his own invention. 3. *The history of man, sucked from the sappe of the most approved anathomists*, &c. in nine books. Lond. 1578, thin fol. 4. *Compendious chirurgery, gathered and translated especially out of Wecker*, &c. Lond. 1585, 12mo. 5. *Antidotary chirurgical, containing variety of all sorts of medicines*, &c. Lond. 1589, 8vo. His works were collected and published in 1633, 4to.

BANISTERIA, in botany, a genus of the trigynia order, belonging to the decandria class of plants; of which there are seven

Species. 1. The angulosa, with a shrubby climbing stalk, is a native of Jamaica. It twists round the neighbouring trees, raising itself to their very top. It is garnished with leaves as large as those of the bay-tree, and of the same thickness: the flowers are produced in long spikes growing at the end of the branches, and are succeeded by two or three winged seeds like those of the greater maple. 2. The fulgens, with smooth oval leaves, is likewise a native of Jamaica and other warm parts of America. It hath slender winding stalks which rise five or six feet high; the flowers grow in a round bunch at the extremity of the branches: they are of a brownish yellow colour; and are also succeeded by winged seeds, but smaller, and with narrower wings, than the former. 3. The bractiata, with climbing diffused branches, grows naturally about Carthagena

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in South America. It sends out many branches which divide again into others, growing without order, and become very busily upward, sending forth tendrils, by which they fasten themselves to the neighbouring trees and mount to a great height; these have stiff oval leaves ending in a point. The flowers are produced in loose spikes at the end of the branches, and are first of a gold colour, fading afterwards to a scarlet. They are succeeded by seeds of the same shape with the former; but slender, thin, and for the most part single. 4. The laurifolia is a native of Campeachy. It hath many irregular climbing stalks, which fasten themselves to the neighbouring trees, and rise to a great height. The leaves are heart-shaped, and hairy on their under side, where they have many transverse ribs. The flowers come out thinly from the side of the branches; they are of a pale yellow colour, and succeeded by large winged seeds which are double. 5. The aculeata, with spikes of flowers growing from the sides of the branches, is a native of Tolu in New Spain. It hath strong woody stalks, covered with an ash-coloured bark, and divided into many branches garnished with winged leaves, composed of five or six pair of small ones whitish on their under side: from the wings of the leaves are produced slender bunches of flowers growing in a racemus like those of the currant-bush, and are of a purplish colour. They are succeeded by broad winged seeds growing erect. 6. The bengalensis is a native of the East Indies, as also of the warm parts of America. It hath strong woody stalks, which twine round the neighbouring trees, and sometimes rise 20 feet high. It hath oblong pointed leaves, like those of the bay-tree, growing by pairs opposite: from the wings of the leaves the flowers are produced in loose spikes growing upon long footstalks; they are of a blue colour, and are succeeded by slender winged seeds which spread open from each other. 7. The purpurea very much resembles the fifth, and is a native of the same country.

Culture. All these plants require to be kept in a bark stove, on account of their being natives of warm climates. They are propagated by seeds, which must be procured from those places where they are natives. The treatment of them differs in nothing material from that of other hot-bed plants.

BANK, in commerce, a common repository, where many persons agree to keep their money, to be always ready at their call or direction: or certain societies or communities, who take the charge of other people's money, either to improve it, or to keep it secure.

The first institution of banks was in Italy, where the Lombard Jews kept benches in the market-places for the exchange of money and bills; and *banco* being the Italian name for *bench*, banks took their title from this word.

Banks are of two principal kinds. 1. One sort is *public*, consisting of a company of monied men, who being duly established, and incorporated by the laws of their country, agree to deposit a considerable fund, or joint stock, to be employed for the use of the society, as lending money upon good security, buying and selling bullion, discounting bills of exchange, &c.: or *private*, i. e. set up by private persons, or partnerships, who deal in the same way as the former upon their own single stock and credit.

The greatest bank of circulation in Europe is the

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Bank

Banisteria.
Bank.

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Bank.

Bank of
England;
its establish-
ment, regula-
tions, im-
portance,
&c.

Bank of England. The company was incorporated by parliament in the fifth and sixth years of king William and queen Mary, by the name of *The Governors and Company of the Bank of England*; in consideration of the loan of 1,200,000 l. granted to the government; for which the subscribers received almost 8 per cent. By this charter, the company are not to borrow under their common seal, unless by act of parliament; they are not to trade, or suffer any person in trust for them to trade, in any goods, or merchandize; but they may deal in bills of exchange, in buying or selling bullion, and foreign gold and silver coin, &c.

By an act of parliament passed in the 8th and 9th year of William III. they were empowered to enlarge their capital stock to 2,201,171 l. 10s. It was then also enacted, that bank-stock should be a personal, and not a real estate; that no contract either in word or writing, for buying or selling bank-stock, should be good in law, unless registered in the books of the bank within 7 days; and the stock transferred in 14 days; and that it shall be felony, without benefit of clergy, to counterfeit the common seal of the bank, or any sealed bank-bill, or any bank-note, or to alter or erase such bills or notes. By another act passed in the 7th of queen Anne, the company were empowered to augment their capital to 4,402,343 l. and they then advanced 400,000 l. more to the government; and in 1714, they advanced another loan of 1,500,000 l.

In the third year of the reign of king George I. the interest in their capital stock was reduced to 5 per cent. when the bank agreed to deliver up as many exchequer bills as amounted to 2,000,000 l. and to accept an annuity of 100,000 l. and it was declared lawful for the bank to call for their members, in proportion to their interests in the capital stock, such sums of money as in a general court should be found necessary. If any member should neglect to pay his share of the moneys so called for, at the time appointed by notice in the London Gazette, and fixed upon the Royal Exchange, it should be lawful for the bank, not only to stop the dividend of such member, and to apply it towards payment of the money in question, but also to stop the transfers of the share of such defaulter, and to charge him with an interest of 5 per cent. per annum, for the money so omitted to be paid; and if the principal and interest should be three months unpaid, the bank should then have power to sell so much of the stock belonging to the defaulter as would satisfy the same. After this, the bank reduced the interest of the 2,000,000 l. lent to the government, from 5 to 4 per cent. and purchased several other annuities, which were afterwards redeemed by the government, and the national debt due to the bank reduced to 1,600,000 l. But in 1742, the company engaged to supply the government with 1,600,000 l. at 3 per cent. which is now called the 3 per cent. annuities; so that the government was now indebted to the company 3,200,000 l. the one half carrying 4, and the other 3 per cent.

In the year 1746, the company agreed that the sum of 986,800 l. due to them in the exchequer bills unfatisfied, on the duties for licences to sell spirituous liquors by retail, should be cancelled, and in lieu thereof to accept of an annuity of 39,442 l. the interest of that sum at 4 per cent. The company also agreed to advance the further sum of 1,000,000 l. into the exche-

quer, upon the credit of the duties arising by the malt and land tax, at 4 per cent. for exchequer bills to be issued for that purpose; in consideration of which, the company were enabled to augment their capital with 986,800 l. the interest of which, as well as that of the other annuities, was reduced to 3½ per cent. till the 25th of December 1757, and from that time to carry only 3 per cent.

And in order to enable them to circulate the said exchequer bills, they established what is now called *bank circulation*. The nature of which may be understood from what follows.

The company of the bank are obliged to keep cash sufficient not only to answer the common, but also any extraordinary demand that may be made upon them; and whatever money they have by them, over and above the sum supposed necessary for the purposes, they employ in what may be called the *trade of the company*; that is to say, in discounting bills of exchange, in buying of gold and silver, and in government securities, &c. But when the bank entered into the abovementioned contract, as they did not keep unemployed a larger sum of money than what they deemed necessary to answer their ordinary and extraordinary demands, they could not conveniently take out of their current cash so large a sum as a million, with which they were obliged to furnish the government, without either lessening that sum they employed in discounting, buying gold and silver, &c. (which would have been very disadvantageous to them), or inventing some method that should answer all the purposes of keeping the million in cash. The method which they chose, and which fully answers their end, was as follows:

They opened a subscription, which they renew annually, for a million of money; wherein the subscribers advance 10 per cent. and enter into a contract to pay the remainder, or any part thereof, whenever the bank shall call upon them, under penalty of forfeiting the 10 per cent. so advanced; in consideration of which, the bank pays the subscribers 4 per cent. interest for the money paid in, and ½ per cent. for the whole sum they agree to furnish; and in case a call shall be made upon them for the whole, or any part thereof, the bank further agrees to pay them at the rate of 5 per cent. per annum for such sum till they repay it, which they are under an obligation to do at the end of the year. By this means the bank obtains all the purposes of keeping a million of money by them; and though the subscribers, if no call is made upon them (which is in general the case), receive 6½ per cent. for the money they advance, yet the company gains the sum of 23,500 l. per annum by the contract; as will appear by the following account.

The bank receives from the government	£.
for the advance of a million	30,000
The bank pays the subscribers who advance	
100,000 l. and engage to pay (when called	6,500
for) 900,000 l. more	
The clear gain to the bank therefore is	23,500

This is the state of the case, provided the company should make no call on the subscribers; which they will be very unwilling to do, because it would not only lessen their profit, but affect the public credit in general.

Bank-stock may not improperly be called a *trading stock*, since with this they deal very largely in foreign gold

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gold and silver, in discounting bills of exchange, &c. Besides which, they are allowed by the government very considerable sums annually for the management of the annuities paid at their office. All which advantages render a share in their stock very valuable; though it is not equal in value to the East India stock. The company make dividends of the profits half yearly, of which notice is publicly given; when those who have occasion for their money, may readily receive it; but private persons, if they judge convenient, are permitted to continue their funds, and to have their interest added to the principal.

This company is under the direction of a governor, deputy-governor, and 24 directors, who are annually elected by the general court, in the same manner as in the East India company. Thirteen, or more, compose a court of directors for managing the affairs of the company. The officers of this company are very numerous.

The stability of the bank of England is equal to that of the British government. All that it has advanced to the public must be lost before its creditors can sustain any loss. No other banking company in England can be established by act of parliament, or can consist of more than six members. It acts, not only as an ordinary bank, but (as we have already seen) as a great engine of state; receiving and paying the greater part of the annuities which are due to the creditors of the public; circulating exchequer-bills; and advancing to government the annual amount of the land and malt taxes, which are frequently not paid up till some years thereafter. It likewise has, upon several different occasions, supported the credit of the principal houses, not only in England, but of Hamburg and Holland. Upon one occasion it is said to have advanced for this purpose, in one week, about 1,600,000*l.* a great part of it in bullion.

In Scotland there are two public banks, both at Edinburgh. The one, called *The Bank of Scotland*, was established by act of parliament in 1695; the other, called *The Royal Bank*, by royal charter in 1727.

Within these twenty-five or thirty years there have also been erected private banking companies in almost every considerable town, and even in some villages. Hence the business of the country is almost entirely carried on by paper-currency, *i. e.* by the notes of those different banking companies; with which purchases and payments of all kinds are commonly made. Silver very seldom appears, except in the change of a twenty-shillings bank-note, and gold still less often. But though the conduct of all those different companies has not been unexceptionable, and has accordingly required an act of parliament to regulate it; the country, notwithstanding, has evidently derived great benefit from their trade. It has been asserted, that the trade of the city of Glasgow doubled in about 15 years after the first erection of the banks there; and that the trade of Scotland has more than quadrupled since the first erection of the two public banks at Edinburgh. Whether the trade, either of Scotland in general, or of the city of Glasgow in particular, has really increased in so great a proportion, during so short a period, we do not pretend to know. If either of them has increased in this proportion, it seems to be an effect too great to be accounted for by the sole operation of this cause.

That the trade and industry of Scotland, however, have increased very considerably during this period, and that the banks have contributed a good deal to this increase, cannot be doubted.

The value of the silver money which circulated in Scotland before the Union, in 1707, and which immediately after it was brought into the bank of Scotland in order to be recoined, amounted to 411,117*l.* 10*s.* 9*d.* sterling. No account has been got of the gold coin; but it appears from the ancient accounts of the mint of Scotland, that the value of the gold annually coined somewhat exceeded that of the silver. There were a good many people too upon this occasion, who, from a diffidence of repayment, did not bring their silver into the bank of Scotland; and there was, besides, some English coin, which was not called in. The whole value of the gold and silver, therefore, which circulated in Scotland before the Union, cannot be estimated at less than a million sterling. It seems to have constituted almost the whole circulation of that country; for though the circulation of the bank of Scotland, which had then no rival, was considerable, it seems to have made but a very small part of the whole. In the present times the whole circulation of Scotland cannot be estimated at less than two millions, of which that part which consists in gold and silver must probably does not amount to half a million. But though the circulating gold and silver of Scotland have suffered so great a diminution during this period, its real riches and prosperity do not appear to have suffered any. Its agriculture, manufactures, and trade, on the contrary, the annual produce of its land and labour, have evidently been augmented.

It is chiefly by discounting bills of exchange, that is, by advancing money upon them before they are due, of bills. that the greater part of banks and bankers issue their promissory notes. They deduct always, upon whatever sum they advance, the legal interest till the bill shall become due. The payment of the bill, when it becomes due, replaces to the bank the value of what had been advanced, together with a clear profit of the interest. The banker, who advances to the merchant whose bill he discounts, not gold and silver, but his own promissory notes, has the advantage of being able to discount to a greater amount, by the whole value of his promissory notes, which he finds by experience are commonly in circulation. He is thereby enabled to make his clear gain of interest on so much a larger sum.

The commerce of Scotland, which at present is not very great, was still more inconsiderable when the two first banking companies were established; and those companies would have had but little trade, had they confined their business to the discounting of bills of exchange. They invented, therefore, another method of issuing their promissory notes; by granting what they called *cash accounts*, that is, by giving credit to the extent of a certain sum, (2000 or 3000*l.* for example), to any individual who could procure two persons of undoubted credit and good landed estate to become surety for him, that whatever money should be advanced to him within the sum for which the credit had been given, should be repaid upon demand, together with the legal interest. Credits of this kind are commonly granted by banks and bankers in all different parts of the world. But the easy terms on which the Scotch banking companies accept of re-payment are peculiar to them,

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Smith's
Wealth of
Nations,
Book II.
chap. ii.

Discounting
of bills.

Cash-accounts.

Scotch
banks, pub-
lic and
private.

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Advantages
from thence;

them, and have, perhaps, been the principal cause, both of the great trade of those companies, and of the benefit which the country has received from it.

Whoever has a credit of this kind with one of those companies, and borrows 1000*l.* upon it, for example, may repay this sum piece-meal, by 20 and 30*l.* at a time, the company discounting a proportionable part of the interest of the great sum from the day on which each of those small sums is paid in, till the whole be in this manner repaid. All merchants, therefore, and almost all men of business, find it convenient to keep such cash-accounts with them; and are thereby interled to promote the trade of those companies, by readily receiving their notes in all payments, and by encouraging all those with whom they have any influence to do the same. The banks, when their customers apply to them for money, generally advance it to them in their own promissory notes. These the merchants pay away to the manufacturers for goods, the manufacturers to the farmers for materials and provisions, the farmers to their landlords for rent, the landlords repay them to the merchants for the conveniences and luxuries with which they supply them, and the merchants again return them to the banks in order to balance their cash accounts, or to replace what they may have borrowed of them; and thus almost the whole money-business of the country is transacted by means of them. Hence the great trade of those companies.

to the
country.

By means of those cash accounts every merchant can, without imprudence, carry on a greater trade than he otherwise could do. If there are two merchants, one in London, and the other in Edinburgh, who employ equal stocks in the same branch of trade, the Edinburgh merchant can, without imprudence, carry on a greater trade, and give employment to a greater number of people, than the London merchant. The London merchant must always keep by him a considerable sum of money, either in his own coffers, or in those of his banker (who gives him no interest for it), in order to answer the demands continually coming upon him for payment of the goods which he purchases upon credit. Let the ordinary amount of this sum be supposed *£*. 500. The value of the goods in his warehouse must always be less by *£*. 500 than it would have been, had he not been obliged to keep such a sum unemployed. Let us suppose that he generally disposes of his whole stock upon hand, or of goods to the value of his whole stock upon hand, once in the year. By being obliged to keep such a great sum unemployed, he must sell in a year *£*. 500 worth less goods than he might otherwise have done. His annual profits must be less by all that he could have made by the sale of *£*. 500 worth more goods; and the number of people employed in preparing his goods for the market, must be less by all those that *£*. 500 more stock could have employed. The merchant in Edinburgh, on the other hand, keeps no money unemployed for answering such occasional demands. When they actually come upon him, he satisfies them from his cash-account with the bank, and gradually replaces the sum borrowed with the money or paper which comes in from the occasional sales of his goods. With the same stock, therefore, he can, without imprudence, have at all times in his warehouse a larger quantity of goods than the London merchant; and can thereby both make a

greater profit himself, and give constant employment to a greater number of industrious people who prepare those goods for the market. Hence the great benefit which the country has derived from this trade.

The late multiplication of banking companies in both parts of the united kingdom, an event by which many people have been much alarmed, instead of diminishing, increases the security of the public. It obliges all of them to be more circumspect in their conduct, and, by not extending their currency beyond its due proportion to their cash, to guard themselves against those malicious runs, which the rivalry of so many competitors is always ready to bring upon them. It restrains the circulation of each particular company within a narrower circle, and reduces their circulating notes to a smaller number. By dividing the whole circulation into a greater number of parts, the failure of any one company, an accident which, in the course of things, must sometimes happen, becomes of less consequence to the public. This free competition too obliges all bankers to be more liberal in their dealings with their customers, lest their rivals should carry them away. In general, if any branch of trade, or any division of labour, be advantageous to the public, the freer and more general the competition, it will always be the more so. See further, the article *PAPER-MONEY*.

2. The other kind of banks consists of such as are instituted wholly on the public account, and are called *Banks of Deposit*; the nature of which not being generally understood, the following particular explanation may not be unacceptable.

The currency of a great state, such as Britain, generally consists almost entirely of its own coin. Should this currency, therefore, be at any time worn, clipped, or otherwise degraded below its standard value, the state by a reformation of its coin can effectually re-establish its currency. But the currency of a small state, such as Genoa or Hamburg, can seldom consist altogether in its own coin, but must be made up, in a great measure, of the coins of all the neighbouring states with which its inhabitants have a continual intercourse. Such a state, therefore, by reforming its coin, will not always be able to reform its currency. If foreign bills of exchange are paid in this currency, the uncertain value of any sum, of what is in its own nature so uncertain, must render the exchange always very much against such a state, its currency being, in all foreign states, necessarily valued even below what it is worth. In order to remedy the inconvenience to which this disadvantageous exchange must have subjected their merchants, such small states, when they began to attend to the interest of trade, have frequently enacted, that foreign bills of exchange of a certain value should be paid, not in common currency, but by an order upon, or by a transfer in the books of, a certain bank, established upon the credit and under the protection of the state; this bank being always obliged to pay, in good and true money, exactly according to the standard of the state. The banks of Venice, Genoa, Amsterdam, Hamburg, and Nuremberg, seem to have been all originally established with this view, though some of them may have afterwards been made subservient to other purposes. The money of such banks, being better than the common currency of the country, necessarily bore an agio, which was greater or smaller, according as the currency was supposed

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II. Banks
of deposit.Smith's
Wealth of
Nations,
Book IV.
chap. iii.

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supposed to be more or less degraded below the standard of the state. The agio of the bank of Hamburg, for example, which is said to be commonly about 14 *per cent.* is the supposed difference between the good standard money of the state, and the clipped, worn, and diminished currency poured into it from all the neighbouring states.

Before 1609, the great quantity of clipped and worn foreign coin, which the extensive trade of Amsterdam brought from all parts of Europe, reduced the value of its currency about 9 *per cent.* below that of good money fresh from the mint. Such money no sooner appeared, than it was melted down or carried away, as it always is in such circumstances. The merchants, with plenty of currency, could not always find a sufficient quantity of good money to pay their bills of exchange; and the value of those bills, in spite of several regulations which were made to prevent it, became in a great measure uncertain. In order to remedy these inconveniences, a bank was established in 1609 under the guarantee of the city. The bank received both foreign coin, and the light and worn coin of the country, at its real and intrinsic value in the good standard money of the country, deducting only so much as was necessary for defraying the expence of coinage, and the other necessary expence of management. For the value which remained after this small deduction was made, it gave a credit in its books. This credit was called *bank-money*; which, as it represented money exactly according to the standard of the mint, was always of the same real value, and intrinsically worth more than current money. It was at the same time enacted, that all bills drawn upon or negotiated at Amsterdam of the value of 600 guilders and upwards should be paid in bank-money, which at once took away all uncertainty in the value of those bills. Every merchant, in consequence of this regulation, was obliged to keep an account with the bank in order to pay his foreign bills of exchange, which necessarily occasioned a certain demand for bank-money.

Bank-money, over and above both its intrinsic superiority to currency, and the additional value which this demand necessarily gives it, has likewise some other advantages. It is secure from fire, robbery, and other accidents; the city of Amsterdam is bound for it; it can be paid away by a simple transfer, without the trouble of counting, or the risk of transporting it from one place to another. In consequence of those different advantages, it seems from the beginning to have borne an agio; and it is generally believed that all the money originally deposited in the bank was allowed to remain there, nobody caring to demand payment of a debt which he could sell for a premium in the market. Besides, this money could not be brought from those coffers, as it will appear by and by, without previously paying for the keeping.

Those deposits of coin, or which the bank was bound to restore in coin, constituted the original capital of the bank, or the whole value of what was represented by what is called *bank-money*. At present they are supposed to constitute but a very small part of it. In order to facilitate the trade in bullion, the bank has been for these many years in the practice of giving credit in its books upon deposits of gold and silver bullion. This credit is generally about 5 *per cent.* below the mint price of such bullion. The bank grants at the same

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time what is called a *recipice* or receipt, intitling the person who makes the deposit, or the bearer, to take out the bullion again at any time within six months, upon re-transferring to the bank a quantity of bank-money equal to that for which credit had been given in its books when the deposit was made, and upon paying $\frac{1}{2}$ *per cent.* for the keeping if the deposit was in silver, and $\frac{1}{4}$ *per cent.* if it was in gold; but at the same time declaring, that in default of such payment, and upon the expiration of this term, the deposit should belong to the bank at the price at which it had been received, or for which credit had been given in the transfer books. What is thus paid for the keeping of the deposit may be considered as a sort of warehouse rent; and why this warehouse rent should be so much dearer for gold than for silver, several different reasons have been assigned. The fineness of gold, it has been said, is more difficult to be ascertained than that of silver. Frauds are more easily practised, and occasion a greater loss in the more precious metal. Silver, besides, being the standard metal, the state, it has been said, wishes to encourage more the making of deposits of silver than of those of gold.

Deposits of bullion are most commonly made when the price is somewhat lower than ordinary; and they are taken out again when it happens to rise. In Holland the market-price of bullion is generally above the mint-price, for the same reason that it was so in England before the late reformation of the gold coin. The difference is said to be commonly from about six to sixteen shillings upon the mark, or eight ounces of silver of eleven parts fine and one part alloy. The bank price, or the credit which the bank gives for deposits of such silver (when made in foreign coin, of which the fineness is well known and ascertained, such as Mexico dollars), is 22 guilders the mark; the mint-price is about 23 guilders; and the market-price is from 23 guilders six, to 23 guilders sixteen shillings, or from 2 to 3 *per cent.* above the mint-price. The proportions between the bank-price, the mint-price, and the market-price of gold bullion are nearly the same. A person can generally sell his receipt for the difference between the mint-price of bullion and the market-price. A receipt for bullion is almost always worth something; and it very seldom happens, therefore, that any body suffers his receipt to expire, or allows his bullion to fall to the bank at the price at which it had been received, either by not taking it out before the end of the six months, or by neglecting to pay the $\frac{1}{2}$ or $\frac{1}{4}$ *per cent.* in order to obtain a new receipt for another six months. This, however, though it seldom happens, is said to happen sometimes, and more frequently with regard to gold than with regard to silver, on account of the higher warehouse-rent which is paid for the keeping of the more precious metal.

The person who by making a deposit of bullion obtains both a bank-credit and a receipt, pays his bills of exchange as they become due with his bank-credit; and either sells or keeps his receipt, according as he judges that the price of bullion is likely to rise or to fall. The receipt and the bank-credit seldom keep long together, and there is no occasion that they should. The person who has a receipt, and who wants to take out bullion, finds always plenty of bank-credits, or bank-money to buy at the ordinary price; and the person who has

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bank-money, and wants to take out bullion, finds receipts always in equal abundance.

The owners of bank-credits and the holders of receipts constitute two different sorts of creditors against the bank. The holder of a receipt cannot draw out the bullion for which it is granted, without re-assigning to the bank a sum of bank-money equal to the price at which the bullion had been received. If he has no bank-money of his own, he must purchase it of those who have it. The owner of bank-money cannot draw out bullion without producing to the bank receipts for the quantity which he wants. If he has none of his own, he must buy them of those who have them. The holder of a receipt, when he purchases bank-money, purchases the power of taking out a quantity of bullion, of which the mint-price is 5 per cent. above the bank-price. The agio of 5 per cent. therefore, which he commonly pays for it, is paid, not for an imaginary, but for a real value. The price of the receipt, and the price of the bank-money, compound or make up between them the full value or price of the bullion.

Upon deposits of the coin current in the country, the bank grants receipts likewise as well as bank-credits; but those receipts are frequently of no value, and will bring no price in the market. Upon ducatoons, for example, which in the currency pass for three gilders three stivers each, the bank gives a credit of three gilders only, or 5 per cent. below their current value. It grants a receipt likewise intitling the bearer to take out the number of ducatoons deposited at any time within six months, upon paying $\frac{1}{2}$ per cent. for the keeping. This receipt will frequently bring no price in the market. Three gilders bank-money generally sell in the market for three gilders three stivers, the full value of the ducatoons if they were taken out of the bank; and before they can be taken out, $\frac{1}{2}$ per cent. must be paid for the keeping, which would be mere loss to the holder of the receipt. If the agio of the bank, however, should at any time fall to 3 per cent. such receipts might bring some price in the market, and might sell for $1\frac{1}{2}$ per cent. But the agio of the bank being now generally about 5 per cent. such receipts are frequently allowed to expire, or, as they express it, to fall to the bank. The 5 per cent. which the bank gains, when deposits either of coin or bullion are allowed to fall to it, may be considered as the warehouse-rent for the perpetual keeping of such deposits.

The sum of bank-money for which the receipts are expired must be very considerable. It must comprehend the whole original capital of the bank, which, it is generally supposed, has been allowed to remain there from the time it was first deposited, nobody caring either to renew his receipt or to take out his deposit, as, for the reasons already assigned, neither the one nor the other could be done without loss. But whatever may be the amount of this sum, the proportion which it bears to the whole mass of bank-money is supposed to be very small. The bank of Amsterdam has for these many years past been the great warehouse

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of Europe for bullion, for which the receipts are very seldom allowed to expire, or, as they express it, to fall to the bank. The far greater part of the bank-money, or of the credits upon the books of the bank, is supposed to have been created, for these many years past, by such deposits which the dealers in bullion are continually both making and withdrawing.

No demand can be made upon the bank but by means of a receipt or receipt. The smaller mass of bank money, for which the receipts are expired, is mixed and confounded with the much greater mass for which they are still in force; so that, though there may be a considerable sum of bank-money for which there are no receipts, there is no specific sum or portion of it which may not at any time be demanded by one. The bank cannot be debtor to two persons for the same thing; and the owner of bank-money who has no receipt cannot demand payment of the bank till he buys one. In ordinary and quiet times, he can find no difficulty in getting one to buy at the market-price, which generally corresponds with the price at what he can sell the coin or bullion it intitles him to take out of the bank.

It might be otherwise during a public calamity; an invasion, for example, such as that of the French in 1672. The owners of bank-money being then all eager to draw it out of the bank, in order to have it in their own keeping, the demand for receipts might raise their price to an exorbitant height. The holders of them might form extravagant expectations, and, instead of 2 or 3 per cent. demand half the bank-money for which credit had been given upon the deposits that the receipts had respectively been granted for. The enemy, informed of the constitution of the bank, might even buy them up in order to prevent the carrying away of the treasure. In such emergencies, the bank, it is supposed, would break through its ordinary rule of making payment only to the holders of receipts. The holders of receipts, who had no bank-money, must have received within 2 or 3 per cent. of the value of the deposit for which their respective receipts had been granted. The bank, therefore, it is said, would in this case make no scruple of paying, either with money or bullion, the full value of what the owners of bank-money who could get no receipts were credited for in its books; paying, at the same time 2 or 3 per cent. to such holders of receipts as had no bank-money, that being the whole value which in this state of things could justly be supposed due to them.

Even in ordinary and quiet times it is the interest of the holders of receipts to depress the agio, in order either to buy bank-money (and consequently the bullion which their receipts would then enable them to take out of the bank) so much cheaper, or to sell their receipts to those who have bank-money, and who want to take out bullion, so much dearer; the price of a receipt being generally equal to the difference between the market-price of bank-money, and that of the coin or bullion for which the receipt had been granted. It is the interest of the owners of bank-money, on the contrary, to raise the agio, in order either to sell their bank-money so much dearer, or to buy a receipt so much cheaper. To prevent the stock-jobbing tricks which those opposite interests might sometimes occasion, the bank has of late years come to a resolution to sell at all times bank-money for currency, at 5 per cent. agio,

agio, and to buy it again at 4 per cent. agio. In consequence of this resolution, the agio can never either rise above 5 or sink below 4 per cent. and the proportion between the market-price of the bank and that of current money is kept at all times very near to the proportion between their intrinsic values. Before this resolution was taken, the market-price of money used sometimes to rise so high as 9 per cent. agio, and sometimes to sink so low as par, according as opposite interests happened to influence the market.

The bank of Amsterdam professes to lend out no part of what is deposited with it, but, for every guilder for which it gives credit in its books, to keep in its repositories the value of a guilder either in money or bullion. That it keeps in its repositories all the money or bullion for which there are receipts in force, for which it is at all times liable to be called upon, and which, in reality, is continually going from it and returning to it again, cannot well be doubted. But whether it does so likewise with regard to that part of its capital for which the receipts are long ago expired, for which in ordinary and quiet times it cannot be called upon, and which in reality is very likely to remain with it for ever, or as long as the States of the United Provinces subsist, may perhaps appear more uncertain. At Amsterdam, however, no part of faith is better established, than that for every guilder circulated as bank-money there is a correspondent guilder in gold and silver to be found in the treasure of the bank. The city is guaranteed that it should be so. The bank is under the direction of the four reigning burgoalmasters, who are changed every year. Each new set of burgoalmasters visits the treasure, compares it with the books, receives it upon oath, and delivers it over, with the same awful solemnity, to the set which succeeds it; and in that sober and religious country oaths are not yet disfigured. A rotation of this kind seems alone a sufficient security against any practices which cannot be avowed. Amidst all the revolutions which faction has ever occasioned in the government of Amsterdam, the prevailing party has at no time accused their predecessors of infidelity in the administration of the bank. No accusation could have affected more deeply the reputation and fortune of the disgraced party; and if such an accusation could have been supported, we may be assured that it would have been brought. In 1672, when the French king was at Utrecht, the bank of Amsterdam paid so readily as left no doubt of the fidelity with which it had observed its engagements. Some of the pieces which were then brought from its repositories appeared to have been scorched with the fire which happened in the town-house soon after the bank was established. Those pieces, therefore, must have lain there from that time.

What may be the amount of the treasure in the bank is a question which has long employed the speculations of the curious. Nothing but conjecture can be offered concerning it. It is generally reckoned, that there are about 2000 people who keep accounts with the bank; and allowing them to have, one with another, the value of 1500l. lying upon their respective accounts, (a very large allowance), the whole quantity of bank-money, and consequently of treasure in the bank, will amount to 3,000,000l. or, at 11 guilders the pound sterling, 33,000,000 of guilders; a great sum, and sufficient to carry on a very extensive circulation, but

vastly below the extravagant ideas which some people have formed of this treasure.

The city of Amsterdam derives a considerable revenue from the bank. Besides what may be called the *ware-house-rent* above mentioned, each person, upon first opening an account with the bank, pays a fee of 10 guilders; and for every new account, 3 guilders 3 stivers; for every transfer, 2 stivers; and if the transfer is for less than 300 guilders, 6 stivers, in order to discourage the multiplicity of small transactions. The person who neglects to balance his accounts twice in the year forfeits 25 guilders. The person who orders a transfer for more than is upon his account, is obliged to pay 3 per cent. for the sum overdrawn, and his order is set aside into the bargain. The bank is supposed too to make a considerable profit by the sale of the foreign coin or bullion which sometimes falls to it by the expiring of receipts, and which is always kept till it can be sold with advantage. It makes a profit likewise by selling bank-money at 5 per cent. agio, and buying it in at 4. These different emoluments amount to a good deal more than what is necessary for paying the salaries of officers, and defraying the expence of management. What is paid for the keeping of bullion upon receipts, is alone supposed to amount to a neat annual revenue of between 150,000 and 200,000 guilders. Public utility, however, and not revenue, was the original object of this institution. Its object was to relieve the merchants from the inconvenience of a disadvantageous exchange. The revenue which has arisen from it was unforeseen, and may be considered as accidental.

BANK, in sea-affairs, denotes an elevation of the ground or bottom of the sea, so as sometimes to surmount the surface of the water, or at least to leave the water so shallow as usually not to allow a vessel to remain a-float over it.—In this sense, *bank* amounts to much the same as flat, shoal, &c. There are banks of sand, and others of stone, called also *shelves*, or *rocks*. In the north sea they also speak of banks of ice, which are large pieces of that matter floating.

BANKER, a person who traffics and negotiates in money; who receives and remits money from place to place by commission from correspondents, or by means of bills or letters of exchange, &c.

The ancient bankers were called *argentarii*, and *nummularii*; by the Greeks, *τραπεζίται*, *κολλυβισται*, and *εργυραριοι*. Their chief business was to put out the money of private persons to interest: they had their boards and benches, for this purpose, in all the markets and public places, where they took in the money from some, to lend it to others.

BANKING, the making of banks to oppose the force of the sea, rivers, or the like, and secure the land from being overflowed thereby. With respect to the water which is to be kept out, this is called *banking*; with respect to the land, which is hereby to be defended, *imbanking*.

BANKING is also applied to the keeping a bank, or the employment of a banker. Banking, in this sense, signifies the trading in money, or remitting it from place to place, by means of bills of exchange. This answers to what the French call *faire la banque*. In France, every body is allowed to bank, whether merchant or not; even foreigners are indulged in this kind of traffic. In Italy, banking does not derogate from nobility.

Bankish,
Bankrupt.

nobility, especially in the republic states; whence it is, that most of the younger sons of great families engage in it. In reality, it was the nobility of Venice and Genoa, that, for a long time, were the chief bankers in the other countries of Europe.

BANKISH, a province of the Mogul's dominions, in the north part of the Hither India, lying south-west of the province of Cassimere.

BANKRUPT, (*bancus ruptus*), is so called, because, when the bank or flock is broken or exhausted, the owner is said to be a *bankrupt*. And this word *bankrupt* is derived from the French *banqueroute*, which signifies a breaking or failing in the world: *banque* in French is as much as *mesa* in Latin, and *route* is the same as *vestigium*; and this term is said to be taken originally from the Roman *mensarii*, which were set in public places, and when a tradesman slipped away, with an intention to deceive his creditors, he left only some *vestigia* or signs of his table or shop behind him. But a bankrupt with us, from the several descriptions given of him in our statute-law, may be defined "a trader, who secretes himself, or does certain other acts tending to defraud his creditors." For the better understanding of this article, it will be proper to consider, 1. *Who* may become a bankrupt: 2. *What acts* make a bankrupt: 3. *The proceedings* on a commission of bankruptcy: and, 4. *In what manner* an estate in goods and chattels may be *transferred* by bankruptcy.—But of these, the two last being treated under the article **COMMISSION OF Bankruptcy**, the two first only belong to this place.

1. A bankrupt was formerly considered merely in the light of a criminal or offender; and in this spirit we are told by Sir Edward Coke, that we have fetched as well the name, as the wickedness, of bankrupts from foreign nations. But at present the laws of bankruptcy are considered as laws calculated for the benefit of trade, and founded on the principles of humanity as well as justice; and to that end they confer some privileges, not only on the creditors, but also on the bankrupt or debtor himself. On the creditors; by compelling the bankrupt to give up all his effects to their use, without any fraudulent concealment: on the debtor; by exempting him from the rigor of the general law, whereby his person might be confined at the discretion of his creditor, though in reality he has nothing to satisfy the debt; whereas the law of bankrupts, taking into consideration the sudden and unavoidable accidents to which men in trade are liable, has given them the liberty of their persons, and some pecuniary emoluments, upon condition they surrender up their whole estate to be divided among their creditors.

In this respect our legislature seems to have attended to the example of the Roman law. We mean not the terrible law of the twelve tables; whereby the creditors might cut the debtor's body into pieces, and each of them take his proportionable share: if indeed that law, *de debitor in partes secando*, is to be understood in so very butcherly a light; which many learned men have with reason doubted. Nor do we mean those less inhuman laws (if they may be called so, as *their* meaning is indisputably certain), of imprisoning the debtor's person in chains; subjecting him to stripes and hard

labour, at the mercy of his rigid creditor; and sometimes selling him, his wife, and children, to perpetual foreign slavery *trans Tiberim* (A): an oppression, which produced so many popular insurrections, and secessions to the *mons sacer*. But we mean the law of cession, introduced by the Christian emperors; whereby, if a debtor *ceded* or yielded up all his fortune to his creditors, he was secured from being dragged to a gaol, "*omni quoque corporali cruciati senoto*." For, as the emperor justly observes, "*inhumanum erat spoliatum fortunæ suis in solidum damari*." Thus far was just and reasonable: but, as the departing from one extreme is apt to produce its opposite, we find it afterwards enacted, that if the debtor by any unforeseen accident was reduced to low circumstances, and would swear that he had not sufficient left to pay his debts, he should not be compelled to cede or give up even that which he had in his possession; a law which, under a false notion of humanity, seems to be fertile of perjury, injustice, and absurdity.

The laws of England, more wisely, have steered in the middle between both extremes: providing at once against the inhumanity of the creditor, who is not suffered to confine an honest bankrupt after his effects are delivered up; and at the same time taking care that all his just debts shall be paid, so far as the effects will extend. But still they are cautious of encouraging prodigality and extravagance by this indulgence to debtors: and therefore they allow the benefit of the laws of bankruptcy to none but actual traders; since that set of men are, generally speaking, the only persons liable to accidental losses, and to an inability of paying their debts, without any fault of their own. If persons in other situations of life run in debt without the power of payment, they must take the consequences of their own indiscretion, even though they meet with sudden accidents that may reduce their fortunes: for the law holds it to be an unjustifiable practice, for any person but a trader to encumber himself with debts of any considerable value. If a gentleman, or one in a liberal profession, at the time of contracting his debts, has a sufficient fund to pay them, the delay of payment is a species of dishonesty, and a temporary injustice to his creditor: and if, at such time, he has not sufficient fund, the dishonesty and injustice is the greater. He cannot therefore murmur, if he suffers the punishment which he has voluntarily drawn upon himself. But in mercantile transactions the case is far otherwise. Trade cannot be carried on without mutual credit on both sides: the contracting of debts is therefore here not only justifiable, but necessary. And if by accidental calamities, as by the loss of a ship in a tempest, the failure of brother traders, or by the non-payment of persons out of trade, a merchant or trader becomes incapable of discharging his own debts, it is his misfortune and not his fault. To the misfortunes therefore of debtors, the law has given a compassionate remedy, but denied it to their faults: since, at the same time that it provides for the security of commerce, by enacting that every considerable trader may be declared a bankrupt, for the benefit of his creditors as well as himself, it has also, to discourage extravagance, declared, that

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Blackst.
Comm. II.
472. &c.

(A) In Pegu, and the adjacent countries in East India, the creditor is entitled to dispose of the debtor himself, and likewise of his wife and children: inasmuch that he may even violate, with impunity, the chastity of the debtor's wife; but then, by so doing, the debt is understood to be discharged.

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that no one shall be capable of being made a bankrupt, but only a trader; nor capable of receiving the full benefit of the statutes, but only an indolent trader.

34 Hen.
III. c. 4.
3 Eliz. c. 7.
7 Jac. I.
19.
Geo. II.
30.

In the interpretation of the several statutes made concerning English bankrupts †, it hath been held, that buying only, or selling only, will not qualify a man to be a bankrupt; but it must be both buying and selling, and also getting a livelihood by it: as, by exercising the calling of a merchant, a grocer, a mercer, or, in one general word, a *chapman*, who is one that buys and sells any thing. But no handicraft occupation (where nothing is bought or sold, and therefore an extensive credit, for the stock in trade, is not necessary to be had) will make a man a regular bankrupt; as that of a husbandman, a gardener, and the like, who are paid for their work and labour. Also an inn-keeper cannot, as such, be a bankrupt: for his gain or livelihood does not arise from buying and selling in the way of merchandize, but greatly from the use of his rooms and furniture, his attendance, and the like: and though he may buy corn and victuals, to sell again at a profit, yet that no more makes him a trader, than a schoolmaster or other person is, that keeps a boarding-house, and makes considerable gains by buying and selling what he spends in the house, and such a one is clearly not within the statutes. But where persons buy goods, and make them up into saleable commodities, as shoemakers, smiths, and the like; here, tho' part of the gain is by bodily labour, and not by buying and selling, yet they are within the statutes of bankrupts; for the labour is only in melioration of the commodity, and rendering it more fit for sale.

2. To learn what the *acts* of bankruptcy are which render a man a bankrupt, we must consult the several statutes, and the resolutions formed by the courts thereon. Among these may therefore be reckoned, 1. Departing from the realm, whereby a man withdraws himself from the jurisdiction and coercion of the law, with intent to defraud his creditors. 2. Departing from his own house, with intent to secrete himself and avoid his creditors. 3. Keeping in his own house, privately, (except for just and necessary cause) so as not to be seen or spoken with by his creditors; which is likewise construed to be an intention to defraud his creditors, by avoiding the process of the law. 4. Procuring or suffering himself willingly to be arrested, or outlawed, or imprisoned, without just and lawful cause; which is likewise deemed an attempt to defraud his creditors. 5. Procuring his money, goods, chattels, and effects, to be attached or sequestered by any legal process; which is another plain and direct endeavour to disappoint his creditors of their security. 6. Making any fraudulent conveyance to a friend, or secret trustee, of his lands, tenements, goods, or chattels; which is an act of the same suspicious nature with the last. 7. Procuring any protection, not being himself privileged by parliament, in order to screen his person from arrests; which also is an endeavour to elude the justice of the law. 8. Endeavouring, or desiring, by any petition to the king, or bill exhibited in any of the king's courts against any creditors, to compel them to take less than their just debts; or to procrastinate the time of payment, originally contracted for; which are an acknowledgment of either his poverty or his knavery. 9. Lying in prison for two months, or more, upon ar-

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rest or other detention for debt, without finding bail, in order to obtain his liberty. For the inability to procure bail argues a strong deficiency in his credit, owing either to his suspected poverty, or ill character; and his neglect to do it, if able, can arise only from a fraudulent intention: in either of which cases, it is high time for his creditors to look to themselves, and compel a distribution of his effects. 10. Escaping from prison after an arrest for a just debt of 100*l.* or upwards. For no man would break prison, that was able and desirous to procure bail; which brings it within the reason of the last case. 11. Neglecting to make satisfaction for any just debt to the amount of 100*l.* within two months after service of legal process, for such debt, upon any trader having privilege of parliament.

These are the several acts of bankruptcy expressly defined by the statutes relating to this article; which being so numerous, and the whole law of bankrupts being an innovation on the common law, our courts of justice have been tender of extending or multiplying acts of bankruptcy by any construction or implication. And therefore Sir John Holt held, that a man's removing his goods privately to prevent their being seized in execution, was no act of bankruptcy. For the statutes mention only fraudulent gifts to third persons, and procuring them to be seized by sham process, in order to defraud creditors: but this, though a palpable fraud, yet, falling within neither of those cases, cannot be adjudged an act of bankruptcy. So also it has been determined expressly, that a banker's stopping or refusing payment is no act of bankruptcy: for it is not within the description of any of the statutes; and there may be good reasons for his so doing, as suspicion of forgery, and the like: and if, in consequence of such refusal, he is arrested, and puts in bail, still it is no act of bankruptcy; but if he goes to prison, and lies there two months, then, and not before, is he become a bankrupt.

As to the consequences resulting from the unhappy situation of a bankrupt, see the article *COMMISSION of Bankruptcy*.

BANKS (John), a dramatic writer, was bred to the law, and belonged to the society of Gray's Inn; but this profession not suiting his natural disposition, he quitted it for the service of the muses. Here, however, he found his rewards by no means adequate to his deserts. His emoluments at the best were precarious, and the various successes of his pieces too feelingly convinced him of the error in his choice. This however did not prevent him from pursuing with cheerfulness the path he had taken; his thirst of fame, and warmth of poetic enthusiasm, alleviating to his imagination many disagreeable circumstances into which indigence, the too frequent attendant on poetical pursuits, frequently threw him. His turn was entirely to tragedy. His merit in which is of a peculiar kind. For at the same time that his language must be confessed to be extremely unpoetical, and his numbers uncouth and unharmonious; nay, even his characters very far from being strongly marked or distinguished, and his episodes extremely irregular; yet it is impossible to avoid being deeply affected at the representation, and even at the reading, of his tragic pieces. This is owing in the general to an happy choice of his subjects; which are all borrowed from history, either real

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or romantic ; and indeed the most of them from circumstances in the annals of our own country, which, not only from their being familiar to our continual recollection, but even from their having some degree of relation to ourselves, we are apt to receive with a kind of partial prepossession, and a pre-determination to be pleased. He has constantly chosen as the basis of his plays such tales as were in themselves and their well-known catastrophes most truly adapted to the purposes of the drama. He has indeed but little varied from the strictness of historical facts ; yet he seems to have made it his constant rule to keep the scene perpetually alive, and never suffer his characters to droop. His verse is not poetry, but prose run mad. Yet will the false gem sometimes approach so near in glitter to the true one, at least in the eyes of all but the real connoisseurs, (and how small a part of an audience are to be ranked in this class will need no ghost to inform us), that bombast will frequently pass for the true sublime ; and where it is rendered the vehicle of incidents in themselves affecting, and in which the heart is apt to interest itself, it will perhaps be found to have a stronger power on the human passions than even that property to which it is in reality no more than a bare succedaneum. And from these principles it is that we must account for Mr Banks's writings having in the general drawn more tears from, and excited more terror in, even judicious audiences, than those of much more correct and more truly poetical authors. The tragedies he has left behind are, 1. *Albion Queens*. 2. *Cyrus the Great*. 3. *Destruction of Troy*. 4. *Innocent Usurper*. 5. *Island Queens*. This is only the *Albion Queens* altered. 6. *Rival Kings*. 7. *Virtue betrayed*. 8. *Unhappy Favourite*. The *Albion Queens* was rejected by the managers in 1684 ; but was acted by queen Anne's command in 1706, with great applause, and has been several times revived. The *unhappy Favourite* continued, till very lately, a stock tragedy at the theatres ; but gives way at present to the later tragedies from the same story, by Jones and Brooke.—Neither the time of the birth, nor that of the death, of this author, are ascertained. His remains, however, lie interred in the church of St James's, Westminster.

BANKS'S ISLAND, a small island in the fourth sea discovered by captain Cook in 1770, in S. Lat. 53. 32. W. Long. 186. 30. It is of a circular figure, and about 24 leagues in compass : it is sufficiently high to be seen at the distance of 12 or 15 leagues ; and the land has a broken irregular surface, with the appearance of barrenness rather than fertility. It is, however, inhabited, as some straggling savages were observed upon it.

BANN, or **BAN** (from the Brit. *ban*, i. e. clamour), is a proclamation or public notice ; any public summons or edict, whereby a thing is commanded or forbidden. It is a word ordinary among the feudists ; and there is both *banus* and *banum*, which signify two several things.—The word *banns* is particularly used in England in publishing matrimonial contracts ; which is done in the church before marriage, to the end that if any persons can speak against the intention of the parties, either in respect of kindred, precontract, or for other just cause, they may take their exception in time, before the marriage is consummated ; and in the canon law, *Bannæ sunt proclamationes sponsi et sponse in ecclesiis fieri solite*. But there may be a faculty or li-

cence for the marriage, and then this ceremony is omitted ; and ministers are not to celebrate matrimony between any persons without a licence, except the bans have been first published three several times, upon pain of suspension, &c. Can. 62.

The use of matrimonial banns is said to have been first introduced in the Gallican church, though something like it obtained even in the primitive times ; and it is this that Tertullian is supposed to mean by *trinudivina promulgatio*. The council of Lateran first extended, and made the usage general. By the ordinance of Blois, no person could validly contract marriage, without a preceding proclamation of three banns ; nor could any person whatever be dispensed with, except for the two last. But the French themselves have abated much of this severity ; and only minors are now under an absolute necessity of submitting to the formality of banns. For majors, or those of age, after publication of the first banns, the two latter are easily bought off.

BANN is also used to denote proscription, or banishment, for a crime proved ; because anciently published by sound of trumpet ; or, as Vossius thinks, because those who did not appear at the above-mentioned summons, were punished by proscription. Hence, to *put a prince under the ban of the empire*, is to declare him divested of all his dignities. The sentence only denotes an interdict of all intercourse, and offices of humanity, with the offender ; the form of which seems taken from that of the Romans, who banished persons by forbidding them the use of fire and water. Sometimes also cities are put under the imperial ban ; that is, stripped of their rights and privileges.

BANN also denotes a pecuniary mulct, or penalty, laid on a delinquent for offending against a bann.

BANN, or **BANNUS**, a title anciently given to the governor or viceroy of Croatia, Dalmatia, and Slavonia.

BANNUS Episcopalis, was a mulct paid to the bishop by those guilty of sacrilege and other crimes.

BANN, is also used for a solemn anathema, or excommunication, attended with curses, &c. In this sense, we read of *papal banns*, &c.

BANN, in military affairs, a proclamation made in the army by beat of drum, sound of trumpet, &c. requiring the strict observance of discipline, either for the declaring a new officer, or punishing an offender.

BANNER denotes either a square flag, or the principal standard belonging to a prince.

We find a multiplicity of opinions concerning the etymology of the word *banner* ; some deriving it from the Latin *bandum*, a band or flag ; others from the word *bann*, to summons the vassals to appear in arms ; others again from the German *ban*, a field or tenement, because landed men alone were allowed a banner ; and, finally, there are some who think it is a corruption of *panniere*, from *pannus*, cloth, because banners were originally made of cloth.

The **BANNER of France**, was the largest and richest of all the flags borne by the ancient kings in their great military expeditions. St Martin's cap was in use six hundred years, as the banner of France : it was made of taffety, painted with the image of that saint, and laid one or two days on his tomb to prepare it for use. About the year 1100, came in a more pompous apparatus. The banner royal was fastened to the top of a mast,

Banneret
+
banqueting
room.

maft, or fome tall tree, planted on a fcaffold, borne on a carriage drawn by oxen, covered with velvet houfings, decorated with devices or cyphers of the prince reigning. At the foot of the tree was a prieft, who faid mafs early every morning. Ten knights mounted guard on the fcaffold night and day, and as many trumpets at the foot of the tree never ceafed flourifhing, to animate the troops. This cumbersome machine, the mode of which was brought from Italy, continued in ufe about 130 years. Its poft was in the centre of the army. And here it was that the chief feats were performed, to carry off and defend the royal banner; for there was no victory without it, nor was an army reputed vanquifhed till they had loft this banner.

BANNERET, a very ancient title of honour, faid to derive its institution from the Romans, towards the end of the emperor Gratian's reign. Knights-banneret are called in Latin *militēs vexilliferi*, by Matth. Paris, p. 134; and *militēs vexillati*, by the author of the *Dift. de Trevoux*; their fshield was fquare, and they bore their arms in a banner of the fame form.

This was a very honourable order, as it was never conferred but for fome heroic action performed in the field; whereas other orders have frequently been beftowed from favour, or other meaner motives. It is faid to have been firft ufed in England in the time of Edward I. We have had none of this order created fince the time of king Charles I. fo that it is now become extinct among us.

The form of the bannerets creation was this: On a day of battle, the candidate prefented his flag to the king, or general, who cutting off the train or fkirrt thereof, and making it a fquare, returned it again, being then the proper banner of bannerets, who from hence are fometimes called *knights of the fquare flag*.

BANNOCK, a kind of oat-cake, baked in the embers, or on a ftone placed before the fire: it is common in the northern parts of this kingdom.

BANNUM, in law, fignifies the utmoft bounds of a manor or town.

BANQUET, a feaft or entertainment, where people regale themfelves with pleafant foods, or fruits.

BANQUET, in the menage, that fmall part of the branch of a bridle that is under the eye; which being rounded like a fmall rod, gathers and joins the extremities of the bit to the branch in fuch a manner, that the banquet is not feen, but covered by the cope, or that part of the bit that is next the branch.

BANQUET-Line, an imaginary line drawn, in making a bit, along the banquet, and prolonged up or down, to adjust the defigned force or weaknefs of the branch, in order to make it fiff or eafy.

BANQUET, or **BANQUETTE**, in fortification, a little foot-bank, or elevation of earth, forming a path which runs along the infide of a parapet, upon which the mufqueteers get up, in order to difcover the counter-fcarp, or to fire on the enemy in the moat or in the covert-way.

BANQUETING-ROOM, or **HOUSE**. See **SALOON**. The ancient Romans fupped in the atrium, or vefibule, of their houfes; but, in after-times, magnificent faloons, or banqueting-rooms, were built, for the more commodious and fplendid entertainment of their guefts. Lucullus had feveral of thefe, each diftinguifhed by the name of fome god; and there was a particular rate of

Banftickle,
Bantam.

expenfe appropriated to each. Plutarch relates with what magnificence he entertained Cicero and Pompey, who went with defign to furprife him, by telling only a flave who waited, that the cloth fhould be laid in the Apollo. The emperor Claudius, among others, had a fplendid banqueting-room, named *Mercury*. But every thing of this kind was outdone by the luftre of that celebrated banqueting-houfe of Nero, called *dumus aurea*; which, by the circular motion of its partitions, and ceilings, imitated the revolution of the heavens, and reprefented the different feafons of the year, which changed at every fervice, and fhowered down flowers, effences, and perfumes, on the guefts.

BANSTICKLE, in ichthyology. See **GASTEROSTEUS**.

BANTAM, a large town of the ifland of Java, in the Eaft Indies, fituated in E. Long. 105. 16. S. Lat. 6. 20. It is the capital of a kingdom of the fame name, with a good harbour and fortified caftle. It is divided into two towns feparated by a river, and one of them inhabited by the Chinefe. For its hiftory, &c. See **JAVA**.

BANTAM-WORK, a kind of painted or carved work, refembling that of Japan, only more gaudy.

There are two forts of Bantam, as well as of Japan work. As, in the latter, fome are flat, lying even with the black, and others high and emboffed; fo, in Bantam-work, fome are flat, and others in-cut, or carved into the wood, as we find in many large fcreens: with this difference, that the Japan artifts work chiefly in gold and other metals; and thofe of Bantam generally in colours, with a fmall fprinkling of gold here and there: for the flat Bantam work is done in colours, mixed with gum-water, proper for the thing defigned to be imitated. For the carved, or in-cut kind, the method of performing it is thus defcribed by an ingenious artift: 1. The wood is to be primed with whitening and fize, fo often, till the primer lie near a quarter of an inch thick; then it is to be water-plained, *i. e.* rubbed with a fine wet cloth, and, fome time after, rubbed very fmooth, the blacks laid on, varnifhed up with a good body, and polifhed well, though with a gentle hand. This done, the defign is to be traced out with vermilion and gum-water, exactly in the manner wherein it is intended to be cut; the figures, trees, buildings, &c. in their due proportion: then the graver is applied, with other tools of proper fhares, differing according to the workman's fancy: with thefe he cuts deep or shallow, as is found convenient, but never deeper than the whitening lies, the wood being never to feel the edge of the inftrument. Lines, or parts of the black, are ftill to be left for the draperies, and other out-lines, and for the diftinction of one thing from another; the rule being to cut where the white is, and leave the black untouched. The carving being finifhed, then take to the pencil, with which the colours are laid into the cut-work: after this, the gold is to be laid in thofe places which the defign requires; for which purpofe, a ftrong thick gum-arabic water is taken, and laid with a pencil on the work; and, while this remains wet, leaf-gold is cut with a fharp fmooth edged knife, in little pieces, fhaped to the bignefs and figure of the places where they are to be laid. Thefe being taken up with a little cotton, they daub them with the fame clofe to the gum-water, which affords a

Bantry,
Baobab.

Baobab.

rich lustre. The work thus finished, they clear up the black with oil, taking care not to touch the colours. The European workmen ordinarily use brags-duft, which is less bright and beautiful.

BANTRY, a town of Ireland, in the county of Cork, and province of Munster. It is seated on a bay of the same name, in W. Long. 9. 15. N. Lat. 51. 30.

BAOBAB, the name given by Prosper Alpinus to the African calabash-tree, since called ADANSONIA. See that article. But the following more particular account of this most remarkable tree, the largest production of the whole vegetable kingdom, will not, it is hoped, appear superfluous.

The trunk is not above 12 or 15 feet high, but from 65 to 78 feet round. The lowest branches extend almost horizontally; and as they are about 60 feet in length, their own weight bends their extremities to the ground, and thus form an hemispherical mass of verdure of about 120 or 130 feet diameter. The roots extend as far as the branches: that in the middle forms a pivot, which penetrates a great way into the earth; the rest spread near the surface. The flowers are in proportion to the size of the tree; and are followed by an oblong fruit, pointed at both ends, about ten inches long, five or six broad, and covered with a kind of greenish down, under which is a ligneous rind, hard and almost black, marked with rays which divide it lengthwise into sides. The fruit hangs to the tree by a pedicle two feet long and an inch diameter. It contains a whitish spongy juicy substance; with seeds of a brown colour, and shaped like a kidney-bean. The bark of this tree is nearly an inch thick, of an ash-coloured grey, greasy to the touch, bright, and very smooth: the outside is covered with a kind of varnish; and the inside is green, speckled with red. The wood is white, and very soft; the first shoots of the year are green and downy.

The tree sheds its leaves in November, and new ones begin to appear in June. It flowers in July, and the fruit ripens in October and November. It is very common in Senegal, and the Cape de Verd islands; and is found 100 leagues up the country at Gulam, and upon the sea-coast as far as Sierra-lione.

The age of this tree is perhaps no less remarkable than its enormous size. M. Adanson relates, that in a botanical excursion to the Magdalen Islands, in the neighbourhood of Goree, he discovered some calabash-trees, from five to six feet diameter, on the bark of which were engraved or cut to a considerable depth a number of European names. Two of these names, which he was at the trouble to repair, were dated one the 14th, the other the 15th century. The letters were about six inches long, but in breadth they occupied a very small part only of the circumference of the trunk: from whence he concluded they had not been cut when these trees were young. These inscriptions, however, he thinks sufficient to determine pretty nearly the age which these calabash-trees may attain; for even supposing that those in question were cut in their early years, and that trees grew to the diameter of six feet in two centuries, as the engraved letters evince, how many centuries must be requisite to give them a diameter of 25 feet, which perhaps is not the last term of their growth! The inscribed trees mentioned by this ingenious Frenchman had been seen in 1555, almost

two centuries before, by Thevet, who mentions them in the relation of his voyage to Terra Antartica or Australis. Adanson saw them in 1749.

The virtues and uses of this tree and its fruit, are various. The negroes of Senegal dry the bark and leaves in the shaded air; and then reduce them to powder, which is of a pretty good green colour. This powder they preserve in bags of linen or cotton, and call it *lilla*. They use it every day, putting two or three pinches of it into a meal, whatever it happens to be, as we do pepper and salt: but their view is, not to give a relish to their food, but to preserve a perpetual and plentiful perspiration, and to temper the too great heat of the blood; purposes which it certainly answers, as several Europeans have proved by repeated experiments, preserving themselves from the epidemic fever, which, in that country, destroys Europeans like the plague, and generally rages during the months of September and October, when, the rains having suddenly ceased, the sun exhales the water left by them upon the ground, and fills the air with a noxious vapour. M. Adanson, in that critical season, made a light ptisan of the leaves of the baobab, which he had gathered in the August of the preceding year, and had dried in the shade; and drank constantly about a pint of it every morning, either before or after breakfast, and the same quantity of it every evening after the heat of the sun began to abate; he also sometimes took the same quantity in the middle of the day, but this was only when he felt some symptoms of an approaching fever. By this precaution he preserved himself, during the five years he resided at Senegal, from the diarrhoea and fever, which are so fatal there, and which are, however, the only dangerous diseases of the place; and other officers suffered very severely, only one excepted, upon whom M. Adanson prevailed to use this remedy, which for its simplicity was despised by the rest. This ptisan alone also prevents that heat of urine which is common in these parts, from the month of July to November, provided the party abstains from wine.

The fruit is not less useful than the leaves and the bark. The pulp that envelopes the seeds has an agreeable acid taste, and is eaten for pleasure: it is also dried and powdered, and thus used medicinally in pelticent fevers, the dysentery, and bloody flux; the dose is a drachm, passed through a fine sieve, taken either in common water, or in an infusion of the plantain. This powder is brought into Europe under the name of *terra sigillata lemnia*.

The woody bark of the fruit, and the fruit itself when spoiled, helps to supply the negroes with an excellent soap, which they make by drawing a ley from the ashes, and boiling it with palm-oil that begins to be rancid.

The trunks of such of these trees as are decayed, the negroes hollow out into burying places for their poets, musicians, buffoons: persons of these characters they esteem greatly while they live, supposing them to derive their superior talents from sorcery or a commerce with demons; but they regard their bodies with a kind of horror when dead, and will not give them burial in the usual manner, neither suffering them to be put into the ground, nor thrown into the sea or any river, because they imagine that the water would not then nourish

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Bapauine
Baptism. rish the fish, nor the earth produce its fruits. The bodies shut up in these trunks become perfectly dry without rotting, and form a kind of mummies without the help of embalment.

The baobab is very distinct from the calabash-tree of America, with which it has been confounded by father Labat. See CRESCENTIA.

BAPAUME, a strong town of Artois in the French Netherlands. It has been in the possession of the French ever since the year 1641; and is seated in a dry spot, in E. Long. 3. 1. N. Lat. 50. 6.

BAPTÆ, in antiquity, an effeminate, voluptuous kind of priests, at Athens, belonging to the goddess Cotytus; thus called from their staid dippings and washings, by way of purification. Their rites were performed in the night, and consisted chiefly of lascivious dances, and other abominations. Eupolis having composed a comedy to expose them, entitled *Baptæ*, they threw him into the sea, to be revenged; and the same fate is also said to have befallen Cratinus, another Athenian poet, who had written a comedy against the Baptæ, under the same title.

BAPTISM, in matters of religion, the ceremony of washing; or a sacrament, by which a person is initiated into the Christian church.—The word is formed from the Greek *βαπτίζω*, of *βαπτο* to dip or wash. Baptism is known, in ecclesiastical writers, by divers other names and titles. Sometimes it is called *palingenesia*, or *laver of regeneration*; sometimes *salus*, or *life and salvation*; sometimes *σφραγις*, *signaculum Domini*, and *signaculum fidei*, or *the seal of faith*; sometimes absolutely *mysterium*, and *sacramentum*; sometimes *the sacrament of faith*; sometimes *viaticum*, from its use to departing persons; sometimes *sacerdotium laici*, or *the lay priesthood*, because allowed, in cases of necessity, to be conferred by laymen: sometimes it is called the *great circumcision*, by reason it succeeds in the room of circumcision, and is the seal of the Christian covenant, as that was the seal of the covenant made with Abraham: so, in regard that baptism had Christ for its author, and not man, it was anciently known by the name of *Δουρον* and *χρίσμα Κυρίου*, *the gift of the Lord*: sometimes it was simply called *δουρον*, without any other addition, by way of eminence, because it was both a gratuitous and singular gift of Christ: in reference to the making men complete members of Christ's body, the church, it had the name of *τελειωσις*, and *τελειωσις*, the *consecration*, and *consummation*; because it gave men the perfection of Christians, and a right to partake of the *Το Τειλισ*, *which was the Lord's Supper*: it had also the name of *μυστικὴ* and *μυσταγωγία*, the *initiation*, because it was the admittance of men to all the sacred rites and mysteries of the Christian religion.

Baptism had its origin from the Jewish church, where it was the practice, long before Christ's time, to baptize proselytes or converts to their faith, as part of the ceremony of their admission; a practice which obtains among them to this day: a person turning Jew, is first circumcised, and, when healed, is bathed, or baptized in water, in presence of their rabbins; after which he is reputed a good Jew.

Grotius is of opinion, that the rite of baptism had its original from the time of the deluge; immediately after which, he thinks, it was instituted in memory of the world having been purged by water. Some learned

men think it was added to circumcision, soon after the Samaritan schism, as a mark of distinction to the orthodox Jews. Spencer, who is fond of deriving the rites of the Jewish religion from the ceremonies of the Pagans, lays it down as a probable supposition, that the Jews received the baptism of proselytes from the neighbouring nations, who were wont to prepare candidates for the more sacred functions of their religion by a solemn ablution; that, by this affinity of sacred rites, they might draw the Gentiles to embrace their religion, and the proselytes (in gaining of whom they were extremely diligent) might the more easily comply with the transition from Gentilism to Judaism. In confirmation of this opinion, he observes, first, that there is no divine precept for the baptism of proselytes, God having enjoined only the rite of circumcision for the admission of strangers into the Jewish religion. Secondly, that, among foreign nations, the Egyptians, Persians, Greeks, Romans, and others, it was customary that those who were to be initiated into their mysteries, or sacred rites, should be first purified by dipping their whole body in water. That learned writer adds, as a further confirmation of his opinion, that the cup of blessing likewise, added to the paschal supper, seems plainly to have been derived from a pagan original: for the Greeks, at their feasts, had one cup, called *σπονγίου* *σχατον* *δαίμονος*, *the cup of the good demon or god*, which they drank at the conclusion of their entertainment, when the table was removed. Since, then, a rite of Gentile origin was added to one of the Jewish sacraments, viz. the passover, there can be no absurdity in supposing, that baptism, which was added to the other sacrament, namely circumcision, might be derived from the same source. In the last place, he observes, that Christ, in the institution of his sacraments, paid a peculiar regard to those rites which were borrowed from the Gentiles: for, rejecting circumcision and the paschal supper, he adopted into his religion baptism and the sacred cup; thus preparing the way for the conversion and reception of the Gentiles into his church.

The design of the Jewish baptism is supposed to be, to import a regeneration, whereby the proselyte is rendered a new man, and of a slave becomes free. The effect of it is, to cancel all former relations; so that those, who were before akin to the person, after the ceremony ceased to be so. It is to this ceremony Christ is supposed to have alluded, in his expression to Nicodemus, that it was necessary he should be born again, in order to become his disciple.—The necessity of baptism to salvation, is grounded on those two sayings of our Saviour: *He that believeth, and is baptized, shall be saved*; and, *Except a man be born of water and of the Spirit, he cannot enter into the kingdom of God*.—The ancients did not generally think the mere want of baptism, where the procuring it was impracticable, excluded men absolutely from the benefit of church-communion, or the hopes of eternal salvation. Some few of them, indeed, are pretty severe upon infants dying without baptism; and some others seem also, in general terms, to deny eternal life to adult persons dying without it: but when they interpret themselves, and speak more distinctly, they make some allowances, and except several cases, in which the want of baptism may be supplied with other means. Such are, martyrdom, which commonly goes by the name of *second baptism*

Baptism.

Opinions concerning the necessity of Baptism to salvation.

Various names given to baptism.

Bingham's Orig. Eccles.

Its origin, &c.

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baptism in mens own blood, in the writings of the ancients; because of the power and efficacy it was thought to have, to save men by the invisible baptism of the spirit, without the external element of water. Faith, and repentance, were also esteemed a supplement to the want of baptism, in such catechumens as died while they were piously preparing themselves for baptism. Constantly communicating with the church, was thought to supply the want of baptism, in persons who had been admitted to communion, on a presumption of their being duly baptized, though the contrary afterwards appeared. For infants dying without baptism, the case was thought more dangerous; as here, no personal faith, repentance, or the like, could be pleaded, to supply the defect, and wash away original sin: on this account, they who spoke most favourably of them, as Greg. Nazianzen, and Severus bishop of Antioch, only assigned them a middle state, neither in heaven nor hell. But the Latins, as St Augustin, Fulgentius, Marius Mercator, &c. who never received the opinion of a middle state, concluded, as they could not be received into heaven, they must go to hell. Pelagius, and his followers, who denied original sin, asserted, that they might be admitted to eternal life and salvation, though not to the kingdom of heaven; between which they distinguished. Where the fault was not on the side of the child, nor his parents, but of the minister, or where any unavoidable accident rendered baptism absolutely impossible, Hincmar, and others, make an exception, in holding the child saved without baptism.—The receiving baptism is not limited to any time, or age of life. Some contend for its being administered like circumcision, precisely on the eighth day, as Greg. Nazianzen; and others would have it deferred till the child is three years of age, and able to hear the mytic words, and make answer thereto, though they do not understand them. In the canon law we find divers injunctions against deferring the baptism of infants beyond the 37th day, 30th day, and the 9th day; some of them under pecuniary forfeitures.

Salmasius, and Suicerus from him, deliver it as authentic history, that, for the two first ages, no one received baptism, who was not first instructed in the faith and doctrine of Christ, so as to be able to answer for himself, that he believed; because of those words, *He that believeth, and is baptized*: which, in effect, is to say, that no infant, for the first two ages, was ever admitted to Christian baptism. But, afterwards, they own, that pædo-baptism came in, upon the opinion that baptism was necessary to salvation. But Vossius, Dr Forbes, Dr Hammond, Mr Walker, and especially Mr Wall, who has exactly considered the testimony and authority of almost every ancient writer that has said any thing upon this subject, endeavour to evince, that infants were baptized even in the apostolical age. It is certain, Tertullian pleads strongly against giving baptism to infants; which shews, at least, that there was some such practice in his age, tho' he disapproved of it. It is certain, the ordinary subjects of this sacrament, in the first ages, were converts from Judaism and Gentilism, who, before they could be admitted to baptism, were obliged to spend some time in the state of catechumens, to qualify them to make their professions of faith, and a Christian life, in their own persons: for, without such personal pro-

fessions, there was ordinarily no admission of them to the privilege of baptism.—Those baptized in their sick-beds were called *clitici*; and were held in some reproach, as not being reputed true Christians. Hence several censures, in councils and ecclesiastical writers, of clinic baptism. This clinic baptism was not sufficient to qualify the person, in case of recovery, for ordination. Some had their baptism put off by way of punishment, when they fell into gross and scandalous crimes, which were to be expiated by a longer course of discipline and repentance. This was sometimes 5, 10, 20 years, or more; even all their lives, to the hour of death, when their crimes were very flagrant.

In the earliest ages of the church, there was no fixed time or place for the reception of baptism. Afterwards, Easter, Whitsuntide, and Epiphany, became solemn seasons, out of which baptism was not administered, except in cases of necessity. The catechumens, who were to receive it at these times, were called *competentes*; and to these it is that St Cyril addresses his catecheses. In the apostolical age, and some time after, before churches and baptisteries were generally erected, they baptized in any place where they had convenience; as John baptized in Jordan, and Philip baptized the eunuch in the wilderness, and Paul the jailor in his own house. But, in after-ages, baptisteries were built adjoining to the church; and then rules were made, that baptism should ordinarily be administered no where but in these buildings. Justinian, in one of his novels, refers to ancient laws, appointing that none of the sacred mysteries of the church should be celebrated in private houses. Men might have private oratories for prayer in their own houses; but they were not to administer baptism or the eucharist in them, unless by a particular licence from the bishop of the place. Such baptisms are frequently condemned in the ancient councils, under the name *παρεκκλησιαστικῆς βαπτισμῆς* in private conventicles.

As to the attendant ceremonies and manner of baptism in the ancient church: The person to be baptized, if an adult, was first examined by the bishop, or officiating priest, who put some questions to him; as, first, Whether he abjured the devil and all his works; secondly, Whether he gave a firm assent to all the articles of the Christian faith: to both which he answered in the affirmative. If the person to be baptized was an infant, these interrogatories were answered by his *sponsors*, or god-fathers. Whether the use of sponsors was as old as the apostles days, is uncertain: perhaps it was not, since Justin Martyr, speaking of the method and form of baptism, says not a word of them.—After the questions and answers, followed exorcism; the manner and end of which was this: The minister laid his hands on the person's head, and breathed in his face, implying thereby the driving away, or expelling, of the devil from him, and preparing him for baptism, by which the good and holy spirit was to be conferred upon him.—After exorcism, followed baptism itself: and first the minister, by prayer, consecrated the water for that use. Tertullian says, "any waters may be applied to that use; but then God must be first invoked, and then the Holy Ghost presently comes down from heaven, and moves upon them, and sanctifies them." The water being consecrated, the person was baptized "in the name of the Father, and of
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Bptism.

"the Son, and of the Holy Ghost;" by which "dedication of him to the blessed Trinity, the person" (says Clemens Alexandrianus) is delivered from the "corrupt trinity, the devil, the world, and the flesh." In performing the ceremony of baptism, the usual custom, (except in clinical cases, or where there was scarcity of water), was to immerse and dip the whole body. Thus St Barnabas, describing a baptized person, says, "We go down into the water full of sin" and filthy, but we ascend bearing fruit in our hearts." And this practice of baptizing naked was so general, that we find no exceptions made in respect either to the tenderness of infants, or the bashfulness of the other sex, unless in case of sickness or other disability. But, to prevent any indecency, men and women were baptized apart. To which end, either the baptisteries were divided into two apartments, one for the men, the other for the women, as Bingham has observed; or the men were baptized at one time, and the women at another, as is shewn by Vollius, from the *Ordo Romanus*, Gregory's *Sacramentarium*, &c. Add, that there was anciently an order of deaconesses, one part of whose business was to assist at the baptism of women. After immersion, followed the unction; by which (says St Cyril) was signified, that they were now cut off from the wild olive, and were ingrafted into Christ, the true olive-tree; or else to shew, that they were now to be champions for the gospel, and were anointed thereto, as the old athletes were against their solemn games. With this anointing was joined the sign of the cross, made upon the forehead of the person baptized; which being done, he had a white garment given him, to denote his being washed from the defilements of sin, or in allusion to that of the apostle, "as many as are baptized into Christ have put on Christ." From this custom the feast of Pentecost, which was one of the annual seasons of baptism, came to be called *Whitsunday*, i. e. *White-day*. This garment was afterwards laid up in the church, that it might be an evidence against such persons as violated or denied that faith which they had owned in baptism.—When the baptism was performed, the person baptized, according to Justin Martyr, "was received into the number of the faithful, who then sent up their public prayers to God," for all men, for themselves, and for those who had "been baptized."

The ordinary ministers, who had the right of administering this sacrament, that is, of applying the water to the body, and pronouncing the formula, were presbyters, or bishops; though on extraordinary occasions, laymen were admitted to perform the same.

As to the present forms of administering baptism, the church of Rome uses the following. When a child is to be baptized, the persons who bring it, take for the priest at the door of the church, who comes thither in his surplice and purple stole, attended by his clerks. He begins with questioning the god-fathers, whether they promise, in the child's name, to live and die in the true catholic and apostolic faith, and what name they would give the child. Then follows an exhortation to the sponsors; after which the priest, calling the child by its name, asks it as follows: *What dost thou demand of the church?* The god-father answers, *Eternal life*. The priest goes on: *If you are desirous of obtaining eternal life, keep God's commandments,*

thou shalt love the Lord thy God, &c. After which he breathes three times in the child's face, saying, *Come out of this child, thou evil spirit, and make room for the Holy Ghost*. This said, he makes the sign of the cross on the child's forehead and breast, saying, *Receive the sign of the cross, on thy forehead, and in thy heart*. Then, taking off his cap, he repeats a short prayer; and, laying his hand gently on the child's head, repeats a second prayer: which ended, he blesses foam salt; and, putting a little of it into the child's mouth, pronounces these words, *Receive the salt of wisdom*. All this is performed at the church-door. The priest, with the god-fathers and god-mothers, coming into the church, and advancing towards the font, repeat the apostles'-creed and the Lord's-prayer. Being come to the font, the priest exorcises the evil spirit again; and taking a little of his own spitte, with the thumb of his right-hand rubs it on the child's ears and nostrils, repeating, as he touches the right ear, the same word (*Ephatha, be thou opened*) which our Saviour made use of to the man born deaf and dumb. Lastly, they pull off its swaddling-cloaths, or strip it below the shoulders, during which the priest prepares the oils, &c. The sponsors then hold the child directly over the font, observing to turn it due east and west: whereupon the priest asks the child, *Whether he renounces the devil and all his works*; and, the god-father having answered in the affirmative, the priest anoints the child between the shoulders in the form of a cross. Then taking some of the consecrated water, he pours part of it thrice on the child's head, at each perfusion calling on one of the Persons of the Holy Trinity. The priest concludes the ceremony of baptism with an exhortation.—The Romish church allows midwives, in cases of danger, to baptize a child before it is come entirely out of its mother's womb: where it is to be observed, that some part of the body of the child must appear before it can be baptized, and that it is baptized on the part which first appears: if it be the head, it is not necessary to rebaptize the child: but if only a foot or hand appears, it is necessary to repeat baptism. A still-born child, thus baptized, may be buried in consecrated ground.

The Greek church differs from the Romish, as to the rite of baptism, chiefly, in performing it by immersion, or plunging the infant all over in the water, which the relations of the child take care to have warmed, and throw into it a collection of the most odoriferous flowers.

The forms of administering baptism among us being too well known to require a particular description, we shall only mention one or two of the more material differences between the form, as it stood in the first liturgy of King Edward, and that in the English Common-Prayer Book at present. First, the form of consecrating the water did not make a part of the office, in King Edward's liturgy, as it does in the present, because the water in the font was changed, and consecrated, but once a month. The form likewise itself was something different from that now used; and was introduced with a short prayer, that *Jesus Christ, upon whom (when he was baptized) the Holy Ghost came down in the likeness of a dove, would send down the same Holy Spirit, to sanctify the fountain of baptism*; which prayer was afterwards left out, at the second review.—By King Edward's first book, the minister is to dip the child

B ptism.

In the Greek Church.

Essential form in the liturgy of King Edward.

Modern forms, in the church of Rome.

Baptism.

child in the water thrice ; first, dipping the right side ; secondly, the left ; the third time, dipping the face toward the font. This trine immersion was a very ancient practice in the Christian church, and used in honour of the Holy Trinity ; though some later writers say, it was done to represent the death, burial, and resurrection, of Christ, together with his three days continuance in the grave. Afterwards, the Arians making an ill use of it, by persuading the people that it was used to denote that the three Persons in the Trinity were three distinct substances, the orthodox left it off, and used only one single immersion.

By the first common-prayer of king Edward, after the child was baptized, the godfathers and godmothers were to lay their hands upon it, and the minister was to put on him the white vestment commonly called the *chrysome*, and to say, " Take this white vesture, as a token of the innocency, which, by God's grace, in this holy sacrament of baptism, is given unto thee ; and for a sign, whereby thou art admonished, so long as thou livest, to give thyself to innocence of living, that after this transitory life thou mayest be partaker of the life everlasting. Amen." As soon as he had pronounced these words, he was to anoint the infant on the head, saying, " Almighty God, the father of our Lord Jesus Christ, who hast regenerated thee by water and the Holy Ghost, and hath given unto thee remission of all thy sins ; may he vouchsafe to anoint thee with the unction of his Holy Spirit, and bring thee to the inheritance of everlasting life. Amen." This was manifestly done in imitation of the practice of the primitive church.

The custom of sprinkling children, instead of dipping them in the font, which at first was allowed in case of the weakness or sickness of the infant, has so far prevailed, that immersion is at length quite excluded. What principally tended to confirm the practice of affusion or sprinkling, was, that several of our Protestant divines, flying into Germany and Switzerland during the bloody reign of queen Mary, and returning home when queen Elizabeth came to the crown, brought back with them a great zeal for the Protestant churches beyond sea, where they had been sheltered and received ; and having observed, that, at Geneva and some other places, baptism was administered by sprinkling, they thought they could not do the church of England a greater piece of service than by introducing a practice dictated by so great an oracle as Calvin. This, together with the coldness of our northern climate, was what contributed to banish entirely the practice of dipping infants in the font.

Notions concerning the effects of baptism.

Many different notions have been entertained concerning the effects of baptism, which it would be endless to enumerate.—The Remonstrants and Socinians reduce baptism to a mere sign of divine grace. The Romanists, on the contrary, exalt its power ; holding, that all sin is entirely taken away by it ; that it absolutely confers the grace of justification, and consequently grace *ex opere operato*. Some also speak of an indelible character impressed on the soul by it, called *character dominicus*, and *character regius* ; but this is held, by others, a mere spectre ; for that the spiritual character, conferred in regeneration, may easily be effaced by mortal sins. Dodwell maintained, that it is by baptism the soul is made immortal ; so that those

who die without it will not rise again. It must be added, he restrains this effect to episcopal baptism alone. From the effects ordinarily ascribed to baptism, even by ancient writers, it should seem, that the ceremony is as much of heathen as Jewish origin ; since Christians do not restrain the use of it, like the Jews, to the admission of new members into the church, but hold, with the heathens, a virtue in it for remitting and washing away sins. The bramins are still said to baptize with this latter view, at certain seasons, in the river Ganges ; to the waters whereof they have annexed a cleansing or sanctifying quality ; and hence it is that they flock from all parts, even of Tartary, driven by the expectation of their being eased of their load of sins. But, in this point, many Christians seem to have gone beyond the folly of the heathens. It was only the smaller sins of infirmity which these latter held to be expiable by washing ; for crimes of a blacker dye, they allowed no water could efface them, no purgation could discharge them. The Christian doctrine of a total remission of sins by baptism could not fail, therefore, to scandalize many among the heathens, and furnished Julian an occasion of satyrizing Christianity itself : Whoever, says he, is guilty of rapes, murders, sacrilege, or any abominable crime, let him be washed with water, and he will become pure and holy.

In the ancient church, baptism was frequently conferred on Jews by violence : but the church itself never seems to have allowed of force on this occasion. By a canon of the fourth council of Toledo, it is expressly forbid to baptize any against their wills. That which looks most like force, in this case, allowed by law, were two orders of Justinian ; one of which appoints the heathens, and the other Samaritans, to be baptized, with their wives and children, and servants, under pain of confiscation. By the ancient laws, baptism was not to be conferred on image-makers, stage-players, gladiators, *aurigæ* or public drivers, magicians, or even strolling beggars, till they quitted such professions. Slaves were not allowed the privilege of baptism without the testimony and consent of their masters ; excepting the slaves of Jews, heathens, and heretics, who were not only admitted to baptism, but, in consequence thereof, had their freedom. Vossius has a learned and elaborate work, *De Baptismo* ; wherein he accurately discusses all the questions concerning baptism, according to the doctrine of the ancient.

BAPTISM by Fire, spoken of by St John the Baptist, has occasioned much conjecture. The generality of the fathers held, that believers, ere they enter paradise, are to pass through a certain fire, which is to purify them from all pollutions remaining on them unexpiated. Others, with St Basil, understand it of the fire of hell ; others, of that of tribulation and temptation. Others, with St Chrysostom, will have it denote an abundance of graces. Others suppose it to mean the descent of the Holy Ghost on the apostles, in form of fiery tongues. Lastly, others maintain, that the word *fire*, here, is an interpolation ; and that we are only to read the text, *He that shall come after me will baptize you with the Holy Ghost*. In reality, it is not found in divers manuscript copies of St Matthew.

The ancient Seleucians and Hermians, understanding the passage literally, maintained, that material fire

Baptism.

Bingham
Orig. Eccl.
l. 11. c. 5.
§ 4. l. 8.
c. 11. § 17.

Baptism.

was necessary in the administration of baptism. But we do not find how, or to what part of the body, they applied it, or whether they were satisfied with obliging the person baptized to pass through the fire. Valentinus re-baptized all who had received water-baptism, and conferred on them the baptism of fire.

Bis decuit tingi, iradidogue corpore flamma.

TERTULL. Carm. contr. Marc. l. 1.

Heracleon, cited by Clemens Alexandrinus, says, that some applied a red-hot iron to the ears of the person baptized, as if to impress some mark upon him.

BAPTISM of the Dead; a custom which anciently prevailed among some people in Africa, of giving baptism to the dead. The third council of Carthage speaks of it as a thing that ignorant Christians were fond of. Gregory Nazianzen also takes notice of the same superstitious opinion prevailing among some who delayed to be baptized. In his address to this kind of men, he asks, whether they staid to be baptized after death? Philastrius also notes it as the general error of the Montanists or Cataphrygians, that they baptized men after death. The practice seems to be grounded on a vain opinion, that, when men had neglected to receive baptism in their life-time, some compensation might be made for this default by receiving it after death.

BAPTISM of the Dead was also a sort of vicarious baptism, formerly in use, where a person dying without baptism, another was baptized in his stead.

St Chrysostom tells us, this was practised among the Marcionites with a great deal of ridiculous ceremony; which he thus describes: After any catechumen was dead, they hid a living man under the bed of the deceased; then coming to the dead man, they asked him, whether he would receive baptism? and he making no answer, the other answered for him, and said, he would be baptized in his stead: and so they baptized the living for the dead.

Epiphanius assures us, the like was also practised among the Corinthians. This practice they pretended to found on the apostle's authority; alleging that text of St Paul for it, *If the dead rise not at all, what shall they do who are baptized for the dead?* A text which has given occasion to a great variety of different systems and explications. Bofius enumerates no less than nine different opinions, among learned divines, concerning the sense of the phrase *being baptized for the dead*.

St Ambrose, and Walafrid Strabo, seem clearly of opinion, that the apostle had respect to such a custom then in being; and several moderns have given into the same opinion, as Baronius, Jos. Scaliger, Jusellus, and Grotius.

Several among the Roman-catholics, as Bellarmine, Salmeron, Menochius, and a number of schoolmen, understand it of the baptism of tears, and penance, and prayers, which the living undergo for the dead; and thus allege it as a proof of the belief of purgatory in St Paul's days.

Hypothetical BAPTISM, that formerly administered in certain doubtful cases, with this formula: *If thou art baptized, I do not rebaptize; if thou art not, I baptize thee in the name of the Father, &c.* This sort of baptism, enjoined by some ancient constitutions of the English church, is now fallen into disuse.

Solemn BAPTISM, that conferred at stated seasons; such, in the ancient church, were the *Paschal baptism*, Vol. II.

and that at Whitfuntide. This is sometimes also called *general baptism*.

Lay-BAPTISM, we find to have been permitted by both the Common-Prayer Books of King Edward, and that of Queen Elizabeth, when an infant is in immediate danger of death, and a lawful minister cannot be had. This was founded upon the mistaken notion of the impossibility of salvation without the sacrament of baptism: but afterwards, when they came to have clearer notions of the sacraments, it was unanimously resolved in a convocation, held in the year 1575, that even private baptism, in a case of necessity, was only to be administered by a lawful minister.

BAPTISM is also applied, abusively, to certain ceremonies used in giving names to things inanimate.

The ancients knew nothing of the custom of giving baptism to inanimate things, as bells, ships, and the like, by a superstitious consecration of them. The first notice we have of this is in the Capitulars of Charles the Great, where it is only mentioned to be censured: but, afterwards, it crept into the Roman offices by degrees. Baronius carries its antiquity no higher than the year 968, when the greatest bell of the church of Lateran was christened by Pope John III. At last it grew to that superstitious height, as to be thought proper to be complained of in the *Centum Gravamina* of the German nation, drawn up in the public diet of the empire held at Norimberg anno 1581; where (after having described the ceremony of baptizing a bell, with god-fathers, who make responses as in baptism, and give it a name, and clothe it with a new garment as Christians were used to be clothed, and all this to make it capable of driving away tempests and devils), they conclude against it, as not only a superstitious practice, but contrary to the Christian religion, and a mere seduction of the simple people.

BAPTISM, in the sea-language, a ceremony in long voyages on board merchant ships, practised both on persons and vessels who pass the tropic or line for the first time. The baptizing the vessel is simple, and consists only in washing them throughout with seawater; that of the passengers is more mysterious. The oldest of the crew, that has past the tropic or line, comes with his face blacked, a grotesque cap on his head, and some sea-book in his hand, followed by the rest of the seamen dressed like himself, each having some kitchen utensil in his hand, with drums beating; he places himself on a seat on the deck, at the foot of the main mast. At the tribunal of this mock magistracy, each passenger not yet initiated, swears he will take care the same ceremony be observed, whenever he is in the like circumstances: Then, by giving a little money by way of gratification, he is discharged with a little sprinkling of water; otherwise he is heartily drenched with streams of water poured upon him: and the ship-boys are inclosed in a cage, and ducked at discretion. —The seamen, on the baptizing a ship, pretend to a right of cutting off the beak-head, unless redeemed by the captain.

BAPTISMAL, something belonging to baptism; thus, we say, baptismal vow, presents, &c.

BAPTISMAL Vow, or Covenant, a profession of obedience to the laws of Christ, which persons in the ancient church made before baptism. It was an indispensable part of the obligation on catechumens, before

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Bar.

they were admitted to the ceremony of regeneration. It was made by turning to the East; for what mystical reasons, is not well agreed on.

BAPTISMAL *Prebends* are in use in Germany, made by the sponsors to the infant, confisting of money, plate, or even sometimes fiefs of lands; which by the laws of the country are to be kept for the child till of age, the parents having only the trust, not the right of disposing of them. An anonymous author has published a discourse exprefs on this occasion, entitled, *De pecunia Infancia*.

BAPTISTS, in church history, the name by which the Anabaptists love to distinguish themselves *.

BAPTISTERY, in ecclesiastical writers, a place in which the ceremony of baptism is performed.

In the ancient church it was one of the exedrae or buildings distinct from the church itself; and consisted of a porch or anti-room where the persons to be baptized made their confession of faith, and an inner room where the ceremony of baptism was performed. Thus it continued till the sixth century, when the baptisteries began to be taken into the church-porch, and afterwards into the church itself.

The ancient baptisteries were commonly called *phorrea*, *photisteria*, q. d. places of illumination; an appellation sometimes given to baptism. Or, they might have the name for another reason, because they were the places of an illumination, or instruction, preceding baptism: for here the catechumens seem to have been trained up, and instructed in the first rudiments of the Christian faith.

Those baptisteries were anciently very capacious; because, as Dr Cave observes, the stated times of baptism returning but seldom, there were usually great multitudes to be baptized at the same time: and then the manner of baptizing, by immersion, or dipping under water, made it necessary to have a large font likewise. In *Venantius Fortunatus*, it is called *aula baptismatis*, the large hall of baptism; which was indeed so capacious, that we sometimes read of councils meeting and sitting therein. This hall, or chapel, was always kept shut during Lent, and the door sealed up with the bishop's seal, not to be opened till Maunday-Thurs day.

The baptistery was always reputed a sacred place. In the Roman order, we find the ceremonies used in the consecration of the baptisteries: they were to be built of a round figure, and distinguished with the image of St John the Baptist; over the basin or font was a figure of a dove in gold or silver, to represent the Holy Ghost.

The name *baptistery* is sometimes also given to a kind of chapel in a large church, which served for the same office. It is an observation of some learned men, that anciently there was but one baptistery in a city, and that at the bishop's church; and that afterwards they were set up in parish churches, with the special allowance however of the bishop.

BAR, in a general sense, denotes a slender piece of wood, or iron, for keeping things close together.

BAR, in courts of justice, an inclosure made with a strong partition of timber, where the council are placed to plead causes. It is also applied to the benches where the lawyers or advocates are seated, because anciently there was a bar to separate the pleaders from

the attorneys and others. Hence our lawyers who are called to the bar, or licensed to plead, are termed *bar-risters*, an appellation equivalent to licentiate in other countries.

BAR, or *Barr*, (Latin *barra*, and in French *barre*), in a legal sense, is a plea or peremptory exception of a defendant, sufficient to destroy the plaintiff's action. And it is divided into bar to common intentment, and bar special; bar temporary, and perpetual. Bar to a common intentment is an ordinary or general bar, which usually disableth the declaration of the plaintiff; bar special is that which is more than ordinary, and falls out upon some special circumstance of the fact as to the case in hand. Terms de Ley. Bar temporary is such a bar as is good for the present, but may afterwards fail; and bar perpetual is that which overthrows the action of the plaintiff for ever.

BAR, in heraldry, an ordinary in form of the scela, but much less. See HERALDRY, n° 22.

BAR, in the menage, the highest part of that place of a horse's mouth situated between the grinders and tusks, so that the part of the mouth which lies under and at the side of the bars retains the name of the gum. A horse with sensible bars has a fine light mouth, with an even and firm appui. See APPUI.

To BAR a Vein, in surgery, is an operation performed upon the veins of the legs of a horse and other parts, with intent to stop the malignant humours. It is done by opening the skin above it, disengaging it, and tying it both above and below, and striking between the two ligatures.

BAR, in music, a stroke drawn perpendicularly across the lines of a piece of music, including between each two a certain quantity or measure of time, which is various as the time of the music is either triple or common. In common time, between each two bars is included the measure of four crotchets; in triple, three. The principal use of bars is to regulate the beating of time in a concert. The use of bars is not to be traced higher than the time when the English translation of Adrian le Roy's book on the *Tablature* was published, viz. the year 1574; and it was some time after that, before the use of bars became general. To come nearer to the point, Barnard's cathedral music, printed in 1641, is without bars: but bars are to be found throughout in the *Ayres and Dialogues* of Henry Lawes published in 1653; from whence it may be conjectured that we owe to Lawes this improvement.

BAR, in hydrography, denotes a bank of sand, or other matter, whereby the mouth of a river is in a manner choaked up.

The term bar is also used for a strong beam whereby the entrance of a harbour is secured: This is more commonly called *boom*.

BAR, among printers, denotes a piece of iron with a wooden handle, whereby the screw of the press is turned in printing. See PRINTING.

BARs of Iron, are made of the metal of the sows and pigs as they come from the furnace. 'These pass thro' two forges called the *finery* and the *chaufery*; where, undergoing five several heats, they are formed into bars.

BAR, a very strong city of Podolia in Poland upon the river Kiow. E. Long. 28. 30. N. Lat. 50. 6.

BAR, a duchy of France, bounded on the east by Lorrain,

* See Anabaptists.

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Lorrain, on the north by Luxembourg, on the west by Champagne, on the south by part of the same country and by Franche Compté. It is crossed by the river Meuse from north to south, and watered by several other rivers, which render it very fertile. It is divided into four bailiages, viz. Bassillyni, Bar, St Michael, and Clermont. The chief towns are Bar-le-duc, Clermont, St Michael, Longuey, Pont a Mousson, and Stenay. In 1736, it was given to Stanislaus then king of Poland.

Bar-le-Duc, the capital of the duchy of Bar, seated on the declivity of a hill. It is divided into the higher and lower town: the lower is watered by the rivulet Orney, which abounds with excellent trouts. The vines are excellent, and not inferior to those of Champagne. E. Long. 5. 30. N. Lat. 48. 35.

Bar-le-Mont, a town of the French Netherlands, in Hainault, situated on the river Sambre. E. Long. 3. 40. N. Lat. 50. 10.

Bar sur Aube, an ancient town of France, seated at the foot of a mountain. E. Long. 4. 50. N. Lat. 48. 14.

Bar sur Seine, a town of France, in the duchy of Burgundy, seated between a mountain which covers it on the west, and the river Seine, which runs on the east. E. Long. 4. 30. N. Lat. 48. 5.

Bar-Master, among miners, the person who keeps the gage, or dish, for measuring the ore.

BARABINZIANs, a tribe of Tartars, living on both sides the river Irty. They seem to derive their name from the *Barabai*an desert, whose lakes supply them abundantly with fish, on which, and their cattle, they chiefly subsist. They have plenty of game and wild-fowl of every kind, particularly ducks and puffins. Most of them are heathens, but Mahometanism daily gains ground among them. Some of them pay tribute to the emperors of Russia, and others to the Khan Taisia.

BARACOA, a town in the north-east part of the island of Cuba. W. Long. 76. 10. N. Lat. 21. 5.

BARALIPTON, among logicians, a term denoting the first indirect mode of the first figure of syllogism. A syllogism in baralipon, is when the two first propositions are general, and the third particular, the middle term being the subject in the first proposition, and the predicate in the second. The following is of this kind:

B A. Every evil ought to be feared;

R A. Every violent passion is an evil;

L I. P. Therefore something that ought to be feared is a violent passion.

BARALLOTS, in church-history, a sect of heretics at Bologna in Italy, who had all things in common, even their wives and children.—Their facility in complying with all manner of debauchery made them get the name *obedientes*, compliers.

BARANCA DE MALAMBO, a town of Terra Firma in America, with a bishop's see, and a good haven. It is a place of great trade, and is seated on the river Magdalena. W. Long. 75. 30. N. Lat. 11. 10.

BARANGI, officers among the Greeks of the lower empire. Cujas calls them in Latia *protectors*, and others give them the name of *securigeri*. It was their business to keep the keys of the city-gates, where the emperor resided.

BARANWAHR, a town of Lower Hungary, in

a county of the same name, taken by the emperor of Germany from the Turks in 1684. It is seated between Buda and Belgrade, in E. Long. 20. 5. N. Lat. 46. 0.

BARATHRUM, in antiquity, a deep dark pit at Athens, into which condemned persons were cast headlong. It had sharp spikes at the top, that no man might escape out; and others at the bottom, to pierce and torment such as were cast in.

BARATZ, (Turkish), letters-patent granted by the Turkish emperors to the Greek patriarch, bishops, &c. for the exercise of their ecclesiastical functions. This *Baratz* gives the bishops full power and authority to establish and depose the inferior clergy, and all other religious persons; to grant licences for marriages, and issue out divorces; to collect the revenues belonging to the churches; to receive the pious legacies bequeathed to them; in short, to enjoy all the privileges and advantages belonging to their high station: and all this (as it is expressed in the *baratz itself*) according to the vain and idle ceremonies of the Christians.

BARB, or **BARBE**, a horse brought from Barbary*. * See *Equus*.

BARBA, in botany, a species of *pubes*, or down, with which the surface of some plants is covered. The term was invented by Linnæus, and made its appearance in the *Delineatio Plantæ*, without any explanation. Its meaning, therefore, has not been accurately ascertained: though, by its application in the *Species Plantarum*, it seems to signify a tuft or bunch of strong hairs terminating the leaves. *Mesembryanthemum barbatus*, furnishes an example.

The word is also often used in composition with some other, to form the trivial names of several plants, as *barba jovis*, *barba capræ*, &c.

BARBACAN, or **BARBICAN**, an outer defence or fortification to a city or castle, used especially as a fence to the city or walls; also, an aperture made in the wall of a fortress, to fire through upon the enemy.

BARBACAN is also used to denote a fort at the entrance of a bridge, or the outlet of a city, having a double wall with towers.

BARBADOES, the most easterly of all the Caribbee Islands, subject to Great Britain, and, according to the best geographers, lying between 59. 50. and 60. 2. of west longitude, and between 12. 56. and 13. 16. of north latitude. Its extent is not certainly known: the most general opinion is, that it is 25 miles from north to south, and 15 from east to west; but these measurements are subject to so many difficulties and uncertainties, that it will perhaps convey a more adequate idea of this island, to tell the reader, that in reality it does not contain above 107,000 acres. The climate is hot, but not unwholesome, the heat being qualified by sea-breezes; and a temperate regimen renders this island as safe to live in, as any climate south of Great Britain; and, according to the opinion of many, as even Great Britain itself. This island has on its east side two streams that are called *rivers*, and in the middle is said to have a bituminous spring which sends forth a liquor like tar, and serves for the same uses as pitch or lamp-oil. The island abounds in wells of good water, and has several reservoirs for rain-water. Some parts of the soil are said to be hollowed into caves, some of them capable of containing 300 people. These are imagined to have been the lurking places of runaway

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negroes, but may as probably be natural excavations. The woods that formerly grew upon the island have been all cut down, and the ground converted into sugar plantations. When those plantations were first formed, the soil was prodigiously fertile, but has since been worn out, inasmuch, that about the year 1730, the planters were obliged to raise cattle for the sake of their dung, by which means the profit of their plantations was reduced to less than a tenth of its usual value. Notwithstanding the smallness of Barbadoes, its soil is different; in some places sandy and light, in others rich, and in others spungy; but all of it is cultivated according to its proper nature, so that the island presents to the eye the most beautiful appearance that can be imagined. Oranges and lemons grow in Barbadoes in great plenty, and in their utmost perfection. The lemon juice here has a peculiar fragrance. The citrons of Barbadoes afford the best drams and sweetmeats of any in the world, the Barbadoes ladies excelling in the art of preserving the rind of the citron fruit. The juice of the limes, or dwarf lemons, is the most agreeable fouring we know, and great quantities of it have of late been imported into Britain and Ireland. The pine apple is also a native of Barbadoes, and grows there to much greater perfection than it can be made to do in Europe by any artificial means. A vast number of different trees peculiar to the climate are also found to flourish in Barbadoes in great perfection; such as the aloe, mangrove, calabash, cedar, cotton, mastic, &c. Here likewise are produced some sensitive plants, with a good deal of garden stuff, which is common in other places. In short, a native of the finest, the richest, and most diversified country in Europe, can hardly form an idea of the variety of delicious and at the same time nutritive vegetable productions with which this island abounds.

When Barbadoes was first discovered by the English, few or no quadrupeds were found upon it, except hogs, which had been left there by the Portuguese. For convenience of carriage to the sea-side, some of the planters at first procured camels; which undoubtedly would in all respects have been preferable to horses for their sugar and other works; but the nature of the climate disagreeing with that animal, it was found impossible to preserve the breed. They then applied for horses to Old and New England: from the former they had those that were fit for shew and draughts; from the latter those that were proper for mounting their militia, and for the saddle. They had likewise some of an inferior breed from Curassao, and other settlements. They are reported to have had their first breed of black cattle from Bonavilla and the isle of May; they now breed upon the island, and often do the work of horses. Their asses are very serviceable in carrying burdens to and from the plantations. The hogs of Barbadoes are finer eating than those of Britain, but the few sheep they have are not near so good. They likewise have goats, which when young are excellent food. Racoons and monkeys are also found here in great abundance. A variety of birds are produced on Barbadoes, of which the humming bird is the most remarkable. Wild fowl do not often frequent this island; but sometimes teal are found near their ponds. A bird which they call the *man of war*, is said to meet ships at 20 leagues from land, and their

return is, to the inhabitants, a sure sign of the arrival of these fishes. When the wind blows from the south and south-west, they have flocks of curlews, plovers, snipes, wild pigeons, and wild ducks. The wild pigeons are very fat and plentiful at such seasons, and rather larger than those of England. The tame pigeons, pullets, ducks, and poultry of all kinds, that are bred at Barbadoes, have also a fine flavour, and are accounted more delicious than those of Europe. Their rabbits are scarce; they have no hares; and if they have deer of any kind, they are kept as curiosities. The insects of Barbadoes are not venomous, nor do either their snakes or scorpions ever sting. The musketoes are troublesome, and bite; but are more tolerable in Barbadoes than on the continent. Various other insects are found on the island, some of which are troublesome, but in no greater degree than those that are produced by every warm summer in England. Barbadoes is well supplied with fish; and some caught in the sea surrounding it are almost peculiar to itself; such as the parrot-fish, snappers, grey cavallos, turbot, and coney-fish. The mullets, lobsters, and crabs, caught here are excellent; and the green turtle is perhaps the greatest delicacy that ancient or modern luxury can boast of. At Barbadoes this delicious shell-fish seldom sells for less than a shilling a pound, and often for more. There is found in this island a kind of land-crab which eats herbs wherever it can find them, and shelters itself in holes and hollows of trees. According to report, they are a shell-fish of passage; for in March they travel to the sea in great numbers. See *CANCER*.

The inhabitants may be reduced to three classes, viz. the masters, the white servants, and the blacks. The former are either English, Scots, or Irish: but the great encouragement given by government to the peopling of this and other West India islands induced some Dutch, French, Portuguese, and Jews, to settle among them with their estates; by which, after a certain time, they acquire the rights of naturalization in Great Britain. The white servants, whether by covenant or purchase, lead more easy lives than the day-labourers in England; and when they come to be over-seers, their wages and other allowances are considerable. As to the treatment of the negro slaves in this and the other islands, that falls to be spoken of under the articles *NEGRO*, *SLAVE*, *WEST-INDIES*; which see. The manners of the white inhabitants, in general, are the same as in most polite towns and countries in Europe. The capital of the island is called *Bridge-Town*; see that article.

As the history of this island furnishes no very remarkable events, the following short hints concerning it may suffice.

When the English, some time after the year 1625, first landed here, they found it the most savage and destitute place they had hitherto visited. It had not the least appearance of ever having been peopled even by savages. There was no kind of beals of pasture or of prey, no fruit, no herb, nor root fit for supporting the life of man. Yet as the climate was so good, and the soil appeared fertile, some gentlemen of small fortune in England resolved to become adventurers thither. The trees were so large, and of a wood so hard and stubborn, that it was with great difficulty they could clear as much ground as was necessary for their subsistence.

Barbadoes
Barbarism.

substance. By unremitting perseverance, however, they brought it to yield them a tolerable support; and they found that cotton and indigo agreed well with the soil; and that tobacco, which was beginning to come into repute in England, answered tolerably. These prospects, together with the storm between the king and parliament, which was beginning to break out in England, induced many new adventurers to transport themselves into this island. And what is extremely remarkable, so great was the increase of people in Barbadoes, 25 years after its first settlement, that in 1650 it contained more than 50,000 whites, and a much greater number of negro and Indian slaves. The latter they acquired by means not at all to their honour: for they seized upon all those unhappy men, without any pretence, in the neighbouring islands, and carried them into slavery; a practice, which has rendered the Caribbee Indians irreconcilable to us ever since. They had begun a little before this, to cultivate sugar, which soon rendered them extremely wealthy. The number of slaves, therefore, was still augmented; and in 1676 it is supposed that their number amounted to 100,000, which, together with 50,000 whites, make 150,000 on this small spot: a degree of population unknown in Holland, in China, or any other part of the world most renowned for numbers. At this time Barbadoes employed 400 sail of ships, one with another, of 150 tons in their trade. Their annual exports in sugar, indigo, ginger, cotton, and citron-water, were above 350,000 l. and their circulating cash at home was 200,000 l. Such was the increase of population, trade, and wealth, in the course of 50 years. But since that time this island has been much on the decline; which is to be attributed partly to the growth of the French sugar-colonies, and partly to our own establishments in the neighbouring isles. Their numbers at present are said to be 20,000 whites, and 100,000 slaves. Their commerce consists of the same articles as formerly, though they deal in them to less extent.

BARBADOES-Tar, a mineral fluid of the nature of the thicker fluid bitumens, of a nauseous bitterish taste, very strong and disagreeable smell, found in many parts of America trickling down the sides of the mountains, and sometimes floating on the surface of the waters. It has been greatly recommended in coughs, and other disorders of the breast and lungs.

BARBARA, among logicians, the first mode of the first figure of syllogisms. A syllogism in barbara is one whereof all the propositions are universal and affirmative; the middle term being the subject of the first proposition, and attribute in the second. For example:

BAR. Every wicked man is miserable;

BA. All tyrants are wicked men;

RA. Therefore all tyrants are miserable.

BARBARIAN, a name given by the ancient Greeks and Romans to all who were not of their own country, or were not initiated in their language, manners, and customs.—In this sense, the word signified with them no more than foreigner; not signifying, as among us, a wild, rude, or uncivilized person.

BARBARISM, in a general sense, a rudeness of language or behaviour.

BARBARISM, in grammar, an offence against the purity of style or language; or an ungrammatical way

of speaking or writing, contrary to the true idiom of any particular language.

BARBARIUM, (anc. geogr), a promontory of Lusitania, to the south of the mouth of the Tagus; now called *Cabo de Espichel*. W. Long. 6°. N. Lat. 37°.

BARBAROSSA, (Aruch, and Hayradin), two famous corsairs, the sons of a potter in the isle of Lesbos; who, turning pirates, carried on their depredations with such success and conduct, that they were soon possessed of twelve galleys beside smaller vessels. Of this fleet Aruch the elder brother, called *Barbarossa* from the redness of his beard, was admiral, and Hayradin the second in command: they called themselves the *friends of the sea*, and the *enemies of all who sailed upon it*; and their names became terrible from the fruits of Dardanelles to those of Gibraltar. With such a power they wanted an establishment; and the opportunity of settling themselves offered in 1516, by the inconsiderate application of Eutemi king of Algiers to them for assistance against the Spaniards. Aruch, leaving his brother to command the fleet, carried 5000 men to Algiers, where he was received as their deliverer; and secretly murdering the prince he came to aid, caused himself to be proclaimed king in his stead. To this usurpation he added the conquest of Tremecen; when his exploits and piracies induced the emperor Charles V. to furnish the marquis de Gomarez governor of Oran with troops to suppress him; by whom he was defeated and killed near Tremecen. His brother Hayradin, known also by the name of *Barbarossa*, assumed the sceptre at Algiers with the same abilities, and with better fortune; for the Spaniards, sufficiently employed in Europe, giving him no disturbance, he regulated the interior police of his kingdom with great prudence, carried on his naval operations with vigour, and extended his conquests on the continent of Africa. He put his dominions under the protection of the Grand Signior, Solymán the Magnificent; and obtained the command of the Turkish fleet. With so powerful a protector, he acquired the kingdom of Tunis in a manner similar to that by which his brother gained Algiers. Since the time of the Barbarossa's, Algiers has been understood to be dependent on the Porte; but this dependence is now little more than merely nominal.*

BARBARUS (Francis), a noble Venetian, was a man of great fame in the 15th century, not only for learning, but likewise for a skillful address in the management of public affairs. He is author of a book *De Re Uxoribus*, and some speeches.

BARBARUS (Hermolaus), grandson of the preceding, one of the most learned men in the 15th century. The public employments he was entrusted with early, did not prevent him from cultivating polite learning with great application. As he was very skillful in the Greek, he undertook the most difficult translations, and began with a famous paraphrase upon Aristotle. He then attempted Diofcorides, whose text he corrected, gave a translation of him, and added a commentary. But of all his works, there is none which has gained him so much reputation as that which he made upon Pliny; he corrected in him above 5000 passages, and occasionally restored 300 in Pomponius Mela. Pope Innocent VIII. to whom he was ambassador, conferred the patriarchate of Aquileia upon him. He was so imprudent as to accept of it without waiting for the consent of his

Barbarium
Barbarus.

* See the
articles
Algiers, Tunis,
and
Turks.



Barbarus, his superiors: though he could not be ignorant that the republic of Venice had made laws to forbid all the ministers they sent to the court of Rome to accept any benifice. His superiors were inflexible; and not being able to gain any thing upon them either by his flattery or his father's interest, the father died of grief, and the son soon followed him.

BARBARUS (Daniel), of the same family with the preceding, was patriarch of Aquileia, and famous for his learning. He was ambassador from Venice to England; and was one of the fathers of the council of Trent, where he acted with great zeal for the interest of the pope. He wrote, 1. A commentary upon Viruvius. 2. *Catena Græcorum Patrum in quinguentia Psalmos Latine versa.* 3. *La Prattica della Perspectiva.* He died in 1569, at 41 years of age.

BARBARY, a kingdom of Africa, including the states of Algiers, Morocco, Tripoli, and Tunis; (see those articles). This country contains almost the whole of what the Romans possessed of the continent of Africa, excepting Egypt. It stretches itself in length from east to west, beginning at the southern limits of Egypt, to the straits of Gibraltar full 35 degrees of longitude; and from thence to Santa Cruz, the utmost western edge of it, about six more, in all 41 degrees: so that the utmost length of Barbary from east to west is computed at above 759 German leagues. On the south, indeed, it is confined within much narrower bounds, extending no farther than from 27 to 35½ degrees of north latitude; so that its utmost breadth from north to south, does not exceed 128 German miles. More particularly, Barbary begins on the west of the famed mount Atlas, called by the Arabs *Ay Duacal*, or *Al Duacal*, inclosing the ancient kingdoms of Suez and Dela, now provinces of Morocco; thence stretching north-eastward along the Atlantic to the pillars of Hercules at Cape Finister, then along the coast of the Mediterranean, it is at last bounded by the city of Alexandria in Egypt.

Concerning the origin of the name *Barbary*, there are many conjectures. According to some, the Romans, after they had conquered this large country, gave it that name out of contempt and dislike to the barbarous manners of the natives, according to their custom of calling all other people but themselves *Barbarians*. Marmol, on the contrary, derives the word *Barbary* from *Berber*, a name which the Arabs gave to its ancient inhabitants, and which they retain to this day in many parts of the country, especially along the great ridge of the mountains of Atlas; and which name was given them on account of the barrenness of their country. According to Leo Africanus, the name of Barbary was given by the Arabs on account of the strange language of the natives, which appeared to them more like a murmur or grumbling of some brute animals than articulate sounds. Others, however, derive it from the Arabic word *bar*, signifying a desert, twice repeated; which was given by one *Ifrik* or *Africus*, a king of Arabia, from whom the whole continent of Africa is pretended to have taken its name. According to them, this king being driven out of his own dominions, and closely pursued by his enemies, some of his retinue called out to him *bar bar*; that is, *To the desert, To the desert*; from which the country was afterwards called *Barbary*.

Among the Romans this country was divided into the provinces of Mauritania, Africa Propria, &c. and they continued absolute masters of it from the time of Julius Cæsar till the year of Christ 428. At that time Bonifacius the Roman governor of these provinces, having through the treachery of Ælius been forced to revolt, called in to his assistance Genserik king of the Vandals, who had been some time settled in Spain. The terms offered, according to Procopius, were, that Genserik should have two thirds, and Bonifacius one third, of Africa, provided they could maintain themselves against the Roman power; and to accomplish this they were to assist each other to the utmost—This proposal was instantly complied with; and Genserik set sail from Spain in May 428, with an army of 80,000 men, according to some, or only 24,000 according to others, together with their wives, children, and all their effects. In the mean time, however, the Empress Placidia, having discovered the true cause of Bonifacius's revolt, wrote a most kind and obliging letter to him, in which she assured him of her favour and protection for the future, exhorting him to return to his duty, and exert his usual zeal for the welfare of the empire, by driving out the barbarians whom the malice of his enemies had obliged him to call in for his own safety and preservation.

Bonifacius readily complied with this request, and offered the Vandals considerable sums if they would retire out of Africa and return to Spain. But Genserik, already master of the greatest part of the country, first returned a scoffing answer, and then, falling unexpectedly on him, cut most of his men in pieces, and obliged Bonifacius himself to fly to Hippo, which place he invested in May 430. The siege lasted till the month of July the following year; when the Vandals were forced, by a famine that began to rage in their camp, to drop the enterprize, and retire. Soon after, Bonifacius having received two reinforcements, one from Rome, and the other, under the conduct of the celebrated Aspar, from Constantinople, a resolution was taken by the Roman generals to offer the enemy battle. The Vandals readily accepting the challenge, a bloody engagement ensued, in which the Romans were utterly defeated, a prodigious number of them taken, and the rest obliged to shelter themselves among the rocks and mountains. Aspar, who commanded the eastern troops, escaped with difficulty to Constantinople, and Bonifacius was recalled to Italy. Upon their departure, the Vandals over-ran all Africa, committing every where the most terrible ravages; which struck the inhabitants of Hippo with such terror, that they abandoned their city, which was first plundered, and then set on fire by the victorious enemy; so that Cirthea and Carthage were now the only strong places possessed by the Romans.

In 435, Genserik, probably being afraid of an attack by the united forces of the eastern and western empires, concluded a peace with the Romans, who yielded to him part of Numidia, the province of Proconularis, and likewise Byzacene; for which, according to Prosper, he was to pay a yearly tribute to the emperor of the east. Genserik delivered up his son Hunnerik by way of hostage; but so great was the confidence which the Romans placed in this barbarian, that some time after they sent him back his son. Of this

Barbary.

3 Subject to the Romans.

4 Bonifacius calls in the Vandals.

5 Endeavouring unsuccessfully to persuade them to return.

6 Romans defeated by Genserik king of the Vandals.

7 Peace concluded with the Vandals.

Barbary.

8
Genferic's
treachery.

this they soon had reason to repent ; for in 439, the Romans being engaged in a war with the Goths in Gaul, Genferic laid hold of that opportunity to seize upon the city of Carthage ; by which he considerably enlarged his African dominions. Valentinian, the Roman emperor, however, maintained as long as he lived, and two Mauritania, with Tripolitana, Tingitana, and that part of Numidia where Ciritha stood.

On the taking of Carthage, Genferic made it the feat of his empire ; and in 440 made a descent on the island of Sicily, where he ravaged the open country, and even laid siege to Palermo. Not being able, however, to reduce that place, he soon returned to Africa, with an immense booty and a vast number of captives. Being now become formidable to both empires, Theodosius emperor of the east resolved to assist Valentinian against so powerful an enemy. Accordingly he fitted out a fleet consisting of 1100 large ships ; and putting on board of it the flower of his army, under the conduct of Arcovindas, Ansilus, and Germanus, he ordered them to land in Africa, and, joining the western forces there, to drive Genferic out of the countries he had seized. But Genferic in the mean time pretending a desire to be reconciled with both empires, amused the Roman general with proposals of peace, till the season for action was over ; and, next year, Theodosius being obliged to recall his forces to oppose the Huns, Valentinian found it necessary to conclude a peace with the Vandals ; and this he could obtain on no other terms than yielding to them the quiet possession of the countries they had seized.

So powerful was Genferic now become, or rather so low was the Roman empire by this time reduced, that in 455, he took and plundered the city of Rome itself, as is fully related under the article *Rome* ; and, after his return to Africa, made himself master of the remaining countries held by the Romans in that part of the world. Heracupon Avitus, who had succeeded Valentinian in the empire, dispatched ambassadors to Genferic, putting him in mind of the treaty he had concluded with the empire in 442 ; and threatening, if he did not observe the articles at that time agreed upon, to make war upon him not only with his own forces, but with those of his allies the Visigoths, who were ready to pass over into Africa. To this Genferic was so far from paying any regard, that he immediately put to sea with a fleet of 60 ships ; but being attacked by the Roman fleet under Ricimer, he was utterly defeated, and forced to fly back into Africa : he returned, however, soon after with a more powerful fleet, committing great ravages on the coast of Italy : but in a second expedition he was not attended with so good success ; the Romans falling unexpectedly upon his men while busied in plundering the country, put great numbers of them to the sword, and among the rest the brother-in-law of Genferic himself. Not content with this small advantage, Majorianus, at that time emperor, resolved to pass over into Africa, and attempt the recovery of that country. For this purpose he made great preparations ; but his fleet being surprized and defeated by the Vandals, thro' the treachery, it is said, of some of his commanders, the enterprize miscarried.

Notwithstanding this misfortune, however, Majorianus persisted in his resolution ; and would in all like-

lihood have accomplished his purpose, had not he himself been murdered soon after by Ricimer. After his death, Genferic committed what ravages he pleased in the poor remains of the western empire, and even made descents on Peloponnesus and the islands belonging to the emperor of Constantinople. To revenge this affront, Leo made vast preparations for the invasion of Africa, inasmuch, that, according to Procopius, he laid out 130,000 pounds weight of gold in the equipment of his army and navy. The forces employed on this occasion were sufficient for expelling the Vandals, had they been much more powerful than they were ; but the command being given to Basiliscus a covetous and ambitious man, the fleet was utterly defeated through his treachery, and all the vast preparations came to nothing. By this last defeat the power of the Vandals in Africa was fully established, and Genferic made himself master of Sicily, as well as of all the other islands between Italy and Africa, without opposition from the western emperors, whose power was entirely taken away in the year 476.

Thus was the Vandalic monarchy in Barbary founded by Genferic, between the years 428 and 468. If we take a view of that prince's government in his new dominions, it presents no very agreeable prospect. Being himself an absolute barbarian in the strictest sense of the word, and an utter stranger to every useful art, he did not fail to shew his own prowess by the destruction of all the monuments of Roman greatness which were so numerous in the country he had conquered. Accordingly, instead of improving his country, he laid it waste, by demolishing all the stately structures both public and private, and all other valuable and sumptuous works with which those proud conquerors had adorned this part of their dominions. So that, whatever monuments the Romans had been at such an immense expence to erect, in order to eternize their own glory, the barbarous Vandals were now at no less pains to reduce into heaps of ruins. Besides this kind of devastation, Genferic made his dominions a scene of blood and slaughter, by persecuting the orthodox Christians ; being himself, as well as most of his countrymen, a zealous Arian ; and for this his long reign is chiefly remarkable. He died in 477, after a reign of 60 years ; and was succeeded by his son Hunneric.

The new king proved yet a greater tyrant than his father, persecuting the orthodox with the utmost fury ; and, during his short reign of seven years and an half, destroyed more of them than Genferic had done in all his lifetime. He is said to have died in the same manner as the heresiarch Arius ; before which time his flesh had been rotting upon his bones, and crawling with worms, so that he looked more like a dead carcase than a living man. Concerning his successors Gutamund, Thrafastund, and Hilderic, we find nothing remarkable, except that they sometimes persecuted, and sometimes were favourable to, the orthodox ; and by his favour for them the last king was ruined. For, having unadvisedly published, in the beginning of his reign, a manifesto, wherein he repealed all the acts of his predecessors against the orthodox, a rebellion was the immediate consequence. At the head of the malcontents was one Glimmer, or Gildemar, a prince of the blood-royal, who by degrees became so powerful, as to depose Hilderic in the seventh year of his reign ;

after

Barbary.

11
Genferic
defeats the
eastern em-
peror's fleet.12
Kingdom of
the Vandals
founded.13
Barbarity
and tyranny
of Genferic.14
Hunneric a
bloody ty-
rant.15
His terrible
death.
† See *Arius*.16
Hilderic de-
posed by
Glimmer.9
Makes him-
self master
of all the
Roman
provinces.10
Defeated by
Ricimer and Ma-
jor-
ianus.

Barbary. after which he caused the unhappy monarch with all his family to be closely confined, and was himself crowned king of the Vandals at Carthage.

17
Belisarius
invades A-
frica;

Gilimer proved a greater tyrant than any that had gone before him. He not only cruelly persecuted the orthodox, but horribly oppressed all the rest, so that he was held in universal abhorrence and detestation when the Greek emperor Justinian projected an invasion of Africa. This expedition of Justinian's is said to have been occasioned by an apparition of Lætus an African bishop, who had been murdered some time before, but now commanded the emperor to attempt the recovery of Africa, and assured him of success. Accordingly, this, or some other motive, prevailed upon Justinian so far, that, notwithstanding his being at that time engaged in a war with Persia, he sent a powerful fleet and army to Africa, under the command of the celebrated general Belisarius, who was for that reason recalled from Persia.

18
Defeats the
Vandals;

So much was Gilimer, all this time, taken up with his own pleasures, or with oppressing his subjects, that he knew little or nothing of the formidable preparations that were making against him. On the arrival of Belisarius, however, he was constrained to put himself into a posture of defence. The management of his army he committed to his two brothers Gundimer and Gelamund, who accordingly attacked the Romans at the head of a numerous force. The engagement was long and bloody; but at last the Vandals were defeated, and the two princes slain. Gilimer, grown desperate at this news, sallied out at the head of his corps de reserve, with full purpose to renew the attack with the utmost vigour; but by his own indifference lost a fair opportunity of defeating the Romans. For no sooner did they perceive Gilimer hastening after them at the head of a fresh army, than they betook themselves to flight; and the greatest part were dispersed in such a manner, that, had the king followed them close, they must have been totally cut off. Instead of this, however, stumbling unfortunately on the body of one of his slain brothers, the sight of it made him lose all thoughts about the enemy; and instead of pursuing them, he spent part of his time in idle lamentations, and part in burying the corpse with suitable pomp and dignity. By this means Belisarius had an opportunity of rallying his men; which he did so effectually, that, coming unexpectedly upon Gilimer, he easily gained a new and complete victory over him.

19
Takes Car-
thage;

This defeat was followed by the loss of Carthage, which the barbarians had been at no pains to put into a posture of defence. After which Gilimer, having in vain endeavoured to obtain assistance from the Moors and Goths, was obliged to recal his brother Tzafon from Sardinia. The meeting between the two brothers was very mournful; but they soon came to a resolution of making one desperate attempt to regain the lost kingdom, or at least recover their captives out of the hands of the enemy. The consequence of this resolution was another engagement, in which Tzafon was killed with 800 of his choicest men, while the Romans lost no more than 50; after which Belisarius moving suddenly forward at the head of all his army, fell upon the camp of the Vandals. This Gilimer was no sooner apprised of, than, without staying to give any more orders to the rest of his army, he fled towards Numidia in the

utmost consternation. His flight was not immediately known among his troops; but when it was, such an universal confusion ensued, that they abandoned their camp to the Romans, who had now nothing to do but plunder it; and not content with this, they massacred all the men found in it, carrying away the women captives.

Thus a total end was put to the power of the Vandals in Barbary, and the Romans once more became masters of this country. The Vandal inhabitants were permitted to remain as they were, on condition of exchanging the heresy of Arius for the orthodox faith. As for Gilimer, he fled with the utmost expedition to Medamus, a town situated on the top of the Pappian mountain, and almost inaccessible by reason of its height and ruggedness. The siege of this place was committed to Pharas, an officer of great experience, who having shut up all avenues to the town, the unhappy Gilimer was reduced to the greatest straits for want of provisions. Pharas being soon apprised of the distress he was in, wrote him a most friendly and pathetic letter, earnestly exhorting him to put an end to the distress of himself and his friends by a surrender. This Gilimer declined; but at the same time concluded his answer with a most submissive request, that Pharas would so far pity his great distress as to send him a loaf of bread, a sponge, and a lute. This strange request greatly surprised Pharas; but at last it was explained by the messenger, who told him that the king had not tasted any baked bread since his arrival on that mountain, and earnestly longed to eat a morsel of it before he died: the sponge he wanted to allay a tumour that was fallen on one of his eyes; and the lute, on which he had learned to play, was to assist him in setting some elegiac verses he had composed on the subject of his misfortunes to a suitable tune. At this mournful report Pharas could not refrain from tears, and immediately dispatched the messenger with the things he wanted.

Gilimer had spent near three winter-months on the summit of this inhospitable mountain, his misery hardening him still more against the thoughts of surrendering, when a melancholy scene in his own family at once reconciled him to it. This was a bloody struggle between two boys, one of them his sister's son, about a flat bit of dough, laid on the coals; which the one seized upon, burning hot as it was, and clapped it into his mouth; but the other by dint of blows forced it out, and eat it from him. This quarrel, which might have ended fatally had not Gilimer interposed, made so deep an impression upon him, that he immediately dispatched a messenger to Pharas, acquainting him that he was willing to surrender himself and all his effects upon the conditions he had offered, as soon as he was assured that they were embraced by Belisarius. Pharas lost no time to get them ratified and sent back to him; after which he was conducted to Belisarius, who gave him a very kind reception. Gilimer was afterwards brought before Justinian in golden chains, whom he besought in the most submissive manner to spare his life. This was readily granted by the emperor; who also allowed him a handsome yearly pension to live up on as a private gentleman. But his mind and heart were too much unsettled and broken to enjoy the sweets of a private state; so that Gilimer, oppressed with grief, died

Barbary.

20
And puts
an end to
the Vandal
monarchy.

21
Gilimer's
extreme dis-
tress.

22
Kindly
treated by
Justinian.

died in the year 534, the first of his captivity, and five years after he had been raised to the throne.

Barhary being thus again reduced under the power of the Romans, its history falls to be taken notice of under that of Rome. In the khalifat of Omar, this country was reduced by the Saracens, as we have already related under the article ARABIA. It continued subject to the khalifs of Arabia and Bagdad till the reign of Harun Al Rashid, who having appointed Ibrahim Ebn Aglab governor of the western parts of his empire, that prefect took the opportunity, first of assuming greater powers to himself than had been granted by the khalif, and then erecting a principality altogether independent of the khalifs. The race of Aglab continued to enjoy their new principality peaceably till the year of the Hegira 297 or 298, during which time they made several descents on the island of Sicily, and conquered part of it. About this time, however, one Obeidallah rebelled against the house of Aglab, and assumed the title of khalif of *Kairwan* (the ancient Cyrene, and residence of the Aglabite princes). To give the greater weight to his pretensions he also took the surname of Al Mohdi, or Al Mahedi, the *director*. According to some, also, he pretended to be descended in a right line from Ali Ebn Abu Taleb, and Fatema the daughter of Mahomet; for which reason, say they, the Arabs called him and his descendants *Fatemitæ*. He likewise encouraged himself and his followers by a traditional prophecy of Mahomet, that at the end of 300 years the sun should rise out of the west. Having at length driven the Aglabites into Egypt, where they became known by the name of *Magrebian*s, he extended his dominions in Africa and Sicily, making *Kairwan* the place of his residence.

In the 300th year of the Hegira, Habbafah, one of Al Mohdi's generals, overthrew the khalif Al Mokhtader's forces in the neighbourhood of Barca, and made himself master of that city. After which he reduced Alexandria itself; and was making great progress in the conquest of the whole country, when Al Mokhtader dispatched against him his two generals Takin and Al Kafem, with an army of 100,000 men. Habbafah being informed that the khalif's troops were in motion, advanced at the head of his army to give them battle, and at last came up with them in an island called by the Arabs *Arad Al Khamfin*. Here he attacked them with incredible bravery, notwithstanding their force was much superior to his; but the approach of night obliged both generals to found a retreat.—The action therefore was by no means decisive, tho' extremely bloody, the khalif's generals having lost 20,000, and Habbafah 10,000. The latter, however, durst not renew the fight next morning; but stole off in the night, and returned hot^{ly}, so that Al Mokhtader in effect gained a victory. In the 302nd year of the Hegira, however, Habbafah returned, possessed himself of Alexandria a second time, defeated a body of the khalif's forces, and killed 7000 of them upon the spot. What further progress he made at that time we are not certainly told; but in the 307th year of the Hegira, Abul Kafem, son to the Fatemite khalif Al Mohdi, again entered Egypt with an army of 100,000 men. At first he met with extraordinary success, and over-ran a considerable part of that fine country. He made himself

master of Alexandria, Al Tayum, Al Baknafa, and the isle of Al Ashmariyn, penetrating even to Al Jizah, where the khalif's army under the command of Munes was posted in order to oppose him. In this country he found means to maintain himself till the 308th year of the Hegira. This year, however, he was entirely defeated by Munes, who made himself master of all his baggage, as well as of the plunder he had acquired; and this blow obliged him to fly to *Kairwan* with the shattered remains of his army, where he remained without making any further attempt on Egypt.

Al Mohdi reigned 24 years; and was succeeded by his son Abul Kafem abovementioned, who then took the surname of *Al Kayem Mohdi*. During his reign we read of nothing remarkable, except the revolt of one Yezid Ebn Condat, a man of mean extraction, but who, having been raised to the dignity of chancellor, found means to raise such a strong party, that the khalif was obliged to shut himself up in the castle of Mohedia. Yezid, being then at the head of a powerful army, soon reduced the capital of *Kairwan*, the cities of Al Rakkada and Tunis, and several other fortresses. He was no less successful in defeating a considerable number of troops which Al Kayem had raised and sent against him, after which he closely besieged the khalif himself in the castle where he had shut himself up. The siege continued seven months; during which time the place was reduced to such straits, that the khalif must either have surrendered it or been starved, when death put an end to his anxiety in the 12th year of his reign, and 334th of the Hegira.

Al Kayem was succeeded by his son Ishmael, who immediately took upon himself the title of *Al Mansur*. This khalif thought proper to conceal the death of his father till he had made the preparations necessary for reducing the rebels. In this he was so successful, that he obliged Yezid to raise the siege of Mohedia the same year; and in the following gave him two great overthrows, obliging him to shut himself up in the fortresses of Kothama, or Cutama, where he besieged him in his turn. Yezid defended the place a long time with desperate bravery; but finding the garrison at last obliged to capitulate, he made shift to escape privately. Al Mansur immediately dispatched a body of forces in pursuit of him; who overtook, and brought him back in fetters; but not till after a vigorous defence, in which Yezid received several dangerous wounds, of which he died in prison. After his death, Al Mansur caused his body to be flayed, and his skin stuffed and exposed to public view. Of Al Mansur's exploits in Sicily an account is given under that article. Nothing farther remarkable happened in his African dominions; and he died after a reign of seven years and 16 days, in the 341st of the Hegira.

Al Mansur was succeeded by his son Abu Zammin Moad, who assumed the surname of *Al Moez Ledinillah*. He proved a very warlike prince, and maintained a bloody contest with Abdalrahman, khalif of Andalusia; for a particular account of which see the article SPAIN. In the 347th year of the Hegira, beginning March 25th 958, Al Moez sent a powerful army to the western extremity of Africa, under the command of Abul Hasan Jawhar, one of his slaves, whom he had advanced to the dignity of Vizir. Jawhar first advanced to a city called *Tahart*, which he besieged for some time

28
Who is utterly defeated by Munes.

29
Rebellion of Yezid.

30
Al Mansur khalif.

31
Death of Yezid.

32
Al Moez Ledinillah khalif.

Barbery,
Barbe.

ineffectually. From thence he marched to Fez, and made the proper dispositions for attacking that city. But finding that Ahmed Ebn Becr, the Emir of the place, was resolved to defend it to the last, he thought proper to abandon the enterprize. However, having traversed all the tract between that capital and the Atlantic ocean, he again sat down before Fez, and took it by storm the following year.

33
He con-
quers E-
gypt.

But the greatest achievement performed by this khalif was his conquest of Egypt, and removal of the khalifat to that country. This conquest, though long projected, he did not attempt till the year of the Hegira 358. Having then made all necessary preparations for it, he committed the care of that expedition to a faithful and experienced general called *Giasfar*, or *Jaa-far*; but in the mean time, this enterprize did not divert Al Moezz from the care of his other conquests, particularly those of Sicily and Sardinia: to the last of which he failed in the year of the Hegira 361, continuing a whole year in it, and leaving the care of his African dominions to an experienced officer named *Yusef Ben Zeiri*. He failed thence the following year for Tripoli in Barbary, where he had not staid long before he received the agreeable news that his general had made himself master of Alexandria. He lost no time, but immediately embarked for it, leaving the government of his old African dominions in the hands of his trusty servant Yusef abovementioned, and arriving safely at that port was received with all the demonstrations of joy. Here he began to lay the foundations of his new Egyptian dynasty, which was to put a final end to the old one of Kairwan after it had continued about 65 years.

34
And trans-
fers the seat
of govern-
ment to that
country.

Al Moezz preserved all his old dominions of Kairwan or Africa Proper. But the ambition or avarice of the governors whom he appointed suffered them to run quickly to a shameful decay; particularly the new and opulent metropolis of Mohedia, on which immense sums had been lavished, as well as labour and care, so as to render it not only one of the richest and statelyest, but one of the strongest, cities in the world: so that we may truly say, the wealth and splendor of this once famed, though short-lived state, took their final leave of it with the departure of the khalif Al Moezz, seeing the whole maritime tract from the Egyptian confines to the straits of Gibraltar hath since become the nest of the most odious piratical crew that can be imagined.

Under the article ALGIERS we have given a short account of the erection of a new kingdom in Barbary by Texeffin; which, however, is there no farther continued than is necessary for the proper understanding the history of that country. A general history might here be given of the whole country of Barbary; but as that would necessarily occasion repetitions under the articles MOROCCO, TRIPOLI, TUNIS, &c. we chuse to refer to those articles for the historical part, as well as for an account of the climate, inhabitants, &c.

BARBE, or BARB. See BARB.

BARBE, in the military art. To fire in barbe, means to fire the cannon over the parapet, instead of firing through the embrasures; in which case, the parapet must not be above three feet and a half high.

BARBE, or BARDE, is an old word, denoting the armour of the horses of the ancient knights and soldiers, who were accoutred at all points. It is said to have

been an armour of iron and leather, wherewith the neck, breast, and shoulders of the horse were covered.

BARBE (St.) a town of Biscay in Mexico, near which are rich silver mines. W. Long. 109. 55. N. Lat. 26. 0.

BARBED, in a general sense, bearded like a fish-hook, set with barbs; also shaved or trimmed.

BARBED, and *Crested*, in heraldry, an appellation given to the combs and gills of a cock, when particularized for being of a different tincture from the body.

A *barbed cross*, is a cross, the extremities whereof are like the barbed irons used for striking of fish.

BARBEL, in ichthyology. See CYPRINUS.

BARBELICOTÆ, an ancient sect of gnostics, spoken of by Theodoret. Their doctrines were absurd, and their ceremonies abominable.

BARBER, one who makes a trade of shaving or trimming the beards of other men for money. Anciently, a lute or viol, or some such musical instrument, was part of the furniture of a barber's shop, which was used then to be frequented by persons above the ordinary level of the people, who resorted to the barber either for the cure of wounds, or to undergo some surgical operations, or, as it was then called, to be *trimmed*, a word that signified either shaving or cutting and curling the hair; these, together with letting blood, were the ancient occupations of the barber-surgeon. As to the other important branch of surgery, the setting of fractured limbs, that was practised by another class of men called *bone-setters*, of whom there are hardly any now remaining. The musical instruments in his shop were for the entertainment of waiting customers; and answered the end of a news-paper, with which at this day those who wait for their turn at the barber's amuse themselves.

BARBERINI (Francis), one of the most excellent poets of his age, was born at Barberino, in Tuscany, in the year 1264. As his mother was of Florence, he settled in that city; where his profession of the law, but especially the beauty of his poetry, raised him a very considerable character. The greatest part of his works are lost; but that which is intitled the *Precepts of Love*, which is a moral poem calculated to instruct those in their duty who have a regard for glory, virtue, and eternity, has had a better fate. It was published at Rome, adorned with beautiful figures, in 1640, by Frederic Ubaldini: he prefixed the author's life; and, as there are in the poem many words which are grown obsolete, he added a glossary to explain them, which illustrates the sense by the authority of contemporary poets.

BARBERINO, a town of Tuscany in Italy, situated at the foot of the Appennine mountains, in E. Long. 12. 15. N. Lat. 43. 40.

BARBERRY, in botany. See P-RRBERIS.

BARBESUL, (anc. geog.) a town and river of Bætica, and a colony in the resort of the Conventus Gaditanus in Spain: now *Marbella* in Granada.*

* See Mar-
bella.

BARBET, in natural history, a name given by M. Reaumur, and other of the French writers, to a peculiar species of the worms which feed on the pucerons, or aphides. See APHIS.

This worm is more especially called *bar bet blanc*, as also *herisson blanc*, or white hedgehog, from its being covered with oblong white tufts of filaments, which stand

tribet.

stand in the manner of the quills of a hedgehog or porcupine. M. Reaumur calls these tufts of filaments, *spines*; not to signify that they are capable of pricking, for they have no such power; but to express their manner of arrangement on the body of the animal.

This creature is of the size of a small fly without its wings; but this tufted covering so much increases the bigness, that it appears of the size of a fly of the largest kind.

These tufts have neither the hardness of spines, nor the consistence of hairs; but they resemble, in their spongy texture, a filament of cotton. All these spines or tufts of cotton are arranged in six lines, as evenly parallel to one another as the shape of the animal's body will permit. Each of these lines reaches over the whole upper part of the body, following the course of one of the rings. The several spines, which compose each line, almost touch one another at their bases; but as they all stand perpendicular, and are placed on a convex surface, they are considerably distant from one another at the points. The tufts on different insects of this species are of different lengths. In the common kinds, they are short, and stand perfectly erect; but in some they are so long, as not to be able to support their own weight, but bend into hooks. In all the species, every single tuft has its irregularities, and is seen to be composed of several cottony filaments of unequal lengths, which are knotty and rough in several places; and when touched, they feel soft like cotton. It is also very remarkable, that, on being touched, they always adhere to the fingers; and are so loosely connected with the body of the animal, that, on rubbing the finger over it ever so lightly, they all come off, and leave it naked. The creature then appears green, and of a very different figure from what it had before; and the tufts lose their figure, and appear only a congeries of round grains of a cottony matter. The sudden change in size and appearance in the creature, makes it look as if it had undergone a transformation.

It is evident from observation, that the matter of which the tufts, which cover the body of this animal, are made, is of a very different nature and formation from the silky filaments which caterpillars and other insects spin out of their entrails. They have all peculiar organs for the spinning it, and all draw it out to any length they please; but this matter, on the contrary, has a determinate length, which it cannot exceed; and is only formed of the matter perspired through certain parts of the body of the creature, which hardens as it remains in the air. As it is so easy to divest these creatures of their downy covering, it will be readily conceived, that nature must have made its reparation to the animal very easy; and this is indeed the case: for if the animal be wholly made naked, by drawing the finger three or four times over it, it loses its fine green colour in half an hour afterwards, appearing as if dusted over with flour; and, in fine, within the space of twelve hours, is furnished with tufts as long, and every way as large, as those it lost. When the tufts have been rubbed off from one of these animals, and its body is left naked, if it be then examined by a microscope, there will be found a number of small hollows or depressions in the skin, exactly answering in place and number to the cottony tufts that are to succeed the lost ones. It is to be conceived, that, within each of

these hollows, there are a great number of fine apertures, through which the matter that is to form the new tufts is to pass; but these are not distinguishable by the most powerful glasses: if the tufts, however, be examined while forming, they will be found to consist of a vast number of regular filaments, placed close by one another, and each running distinctly the whole length of the tuft: this appearance is, however, wholly lost afterwards, the fine threads sticking to, and intermingling with, one another, and many of them breaking in several places; so that the whole tuft resembles a coarse and single filament.

These barbets are found in great plenty on the leaves of the plum-tree in the months of June and July. The puceron of this tree seems more to their taste than any other kind; and they are often found in numbers on every leaf of the tree where these little animals are. The matter of their tufts seems analogous to the downy covering of some of the pucerons, and to no other substance in the animal world. The puceron of the beech-tree has this downy matter running into much longer filaments even than this animal; and, in the several other species, it is found growing to the different lengths from this to a mere downy powder. The barbet lives about a fortnight in that form, and then becomes a chrysalis; from which, after a month, there comes out a small beetle of a dusky brown colour.

BARBETS, the name of the inhabitants of several valleys in Piedmont, particularly those of Lucerna, Angrona, Perugia, and St Martin.

BARBEYRAC (John), was born in Besiers in Lower Languedoc in 1674. He was made professor of law and history at Lausanne in 1710; which he enjoyed for seven years, and during that time was three times rector: in 1717, he was professor of public and private law at Groningen. He translated into French the two celebrated works of Puffendorf, his *Law of Nature and Nations*, and his *Duties of a Man and a Citizen*; to both which he wrote excellent notes, and to the former an introductory preface. He translated also Grotius's treatise *De Jure Belli ac Pacis*, with large and excellent notes; and several of Tillotson's sermons. He wrote a work intitled *Traite de Jev*, 2 vols 8vo.

BARBEZIEUX, a town of Saintonge in France, with the title of a marquise. It hath a manufacture of linen cloth; and lies in W. Long. o. 5. N. Lat. 45. 23.

BARBICAN, or BARBACAN. See BARBACAN.

BARBITOS, or BARBITON, an ancient instrument of music, mounted with three, others say seven, strings; much used by Sappho and Alceus, whence it is also denominated *Leiboun*.

BARBLES, or BARBS, in farriery, the knots or superfluous flesh that grow up in the channels of a horse's mouth; that is, in the intervals that separate the bars, and lie under tongue.

BARBOUR (John), arch-deacon of Aberdeen, was esteemed an elegant poet in the reign of David I. He wrote the history of Robert the Bruce, in an heroic poem, which is still extant, and which contains many facts and anecdotes omitted by other historians. The latest edition of this book is that of Glasgow, 8vo, printed in the year 1672. It is entitled, "The acts and life of the most victorious conqueror Robert Bruce king of Scotland; wherein also are contained the mar-

Barbet

Barbour.

tial deeds of the valiant princes Edward Bruce, Sir James Dowglafs, Earl Thomas Randal, Walter Stewart, and sundry others." In one paffage, he calls it a *romance*; but that word was then of good reputation: every body knows that the 'Romance of romaunts' has been innocently applied to true history; as well as the 'Ballad of ballads' to a sacred fong.

BARBUDA, one of the British Caribbee iflands, about 20 miles long and 12 broad. It is low land, but fruitful and pretty populous. The inhabitants addict themselves to hufbandry, and find always a ready market for their corn and cattle in the fugar iflands. Barbuda is the property of the Codrington family, who have great numbers of negroes here as well as in Barbadoes. It lies in W. Long. 61. 3. N. Lat. 18. 5.

BARCA, a large country of Africa, lying on the coasts of the Mediterranean fea, between the kingdoms of Egypt and Tripoli, extending itfelf in length from east to weft from the 39th to the 46th degree of east longitude, and in breadth from north to fouth about 30 leagues, as is generally fuppofed. It is for the moft part, efpecially in the middle, a dry faudy defart; on which account the Arabs call it *Sabart*, or *Ceyart Barka*, that is, the defart or road of whirlwinds or hurricanes. It labours almoft every where under a great fcarcity of water; and except in the neighbourhood of towns and villages, where the ground produces fome small quantities of grain, fuch as millet, and fome maize, the reft is in a manner quite barren and uncultivated, or, to fpeak more properly, uncultivable: and even of that small quantity which thofe few fots produce, the poor inhabitants are obliged to exchange fome part with their indigent neighbours, for dates, fheep, and camels, which they ftand in greater need of than they, by reafon of their great fcarcity of grafs and other proper food; for want of which, thofe that are brought to them feldom thrive or live long. In this country flood the famed temple of Jupiter Ammon; and notwithstanding the pleafantnefs of the fpot where it flood, this part of the country is faid to have been the moft dangerous of any, being furrounded with fuch quick and burning fands as are very detrimental to travellers; not only as they fink under their feet, but being light, and heated by the rays of the fun, are eafily raifed by every breath of wind; which, if it chance to be in their faces, almoft burns their eyes out, and ruffles them for want of breath; or, if vehement, often overwhelms whole caravans. Againft this temple Cambyfes king of Perfia difpatched an army of 50,000 men. They fet out from Thebes in upper Egypt, and under the conduct of proper guides reached the city of Oafis feven days journey from that place: but what was their fate afterwards is uncertain; for they never returned either to Egypt, or to their own country. The Ammonians informed Herodotus, that, after the army had entered the fandey defart which lies beyond Oafis, a violent wind began to blow from the fouth at the time of their dinner, and raifed the fand to fuch a degree, that the whole army was overwhelmed and buried alive.

Concerning the government or commerce of this country we know nothing certain. Moft probably the maritime towns are under the protection of the Porte: but whether under the bafha of Egypt or Tripoli, or whether they have formed themfelves into independent

ftates like thofe of Algiers and Tunis, we cannot fay; only we are told that the inhabitants of the maritime towns are more civilized than thofe that dwell in the inland parts. The firft profefs Mahometanifm, and have imbibed fome notions of humanity and juftice; whilft the latter, who have neither religion, nor any fign of worfhip among them, are altogether favage and brutifh. They are a fort of Arabs, and like them live entirely upon theft and plunder. By them this tract, which before was a continued defart, was firft inhabited. At their firft coming in, they fettled themfelves in one of the beft places of the country; but as they multiplied, and had frequent wars with one another, the ftrongeft drove the weakeft out of the beft fots, and fent them to wander in the defart parts, where they live in the moft miserable manner, their country hardly affording one fingle neceffary of life. Hence it is that they are faid to be the ugliest of all the Arabs: their bodies having fcarcely any thing but fkin and bone, their faces meagre, with fierce ravenous looks; their garb, which is commonly what they take from the paffengers who go through thefe parts, tattered with long wearing; while the pooreft of them have fcarce a rag to cover their nakednefs. They are moft expert and refolute robbers, that being their chief employment and livelihood; but the travellers in thefe parts are fo few, that the Barcans are often neceffitated to make diftant excursions into Numidia, Libya, and other fouthern countries. Thofe that fall into their hands are made to drink plenty of warm milk: then they hang them up by the feet, and fhake them, in order to make them vomit up any money they think they have fwallowed; after which, they ftrip them of all their clothes, even to the laft rag: but, with all this inhumanity, they commonly fpare their life, which is more than the other African robbers do. Yet, notwithstanding every artifice they can ufe, the Barcans are fo poor, that they commonly let, pledge, or even fell, their children to the Sicilians and others from whom they have their corn, efpecially before they fet out on any long excursion.

BARCALON, an appellation given to the prime minifter of the king of Siam. The barcalon has in his department every thing relating to commerce, both at home and abroad. He is likewife fuperintendent of the king's magazines.

BARCELONA, a handfome, rich, and ftrong city of Spain, in the province of Catalonia, of which it is the capital. This city was originally founded by Hamilecar Barcas, and from him called *Barcino*. It was reduced by the Romans, and continued fubject to them till the kingdom of Spain was over-run by the Goths and Vandals, and afterwards by the Saracens or Moors. In the beginning of the 9th century, Barcelona was in the hands of the Moors, and under the government of one *Zade*. This governor having more than once abused the clemency of Charlemagne, at laft irritated Lewis king of Aquitain, and fon to Charles, to fuch a degree, that he gave orders to his generals to invelt the city, and not to rife from before it till they had put Zade into his hands. The Moor made a moft obftinate refiftance, fo that the fiege lafted many months: at laft, finding it impoffible to preferve the city much longer, and being deltitute of all hopes of relief, he determined, or rather was compelled by the inhabitants, to go to the

Christian

Christian camp, and implore the emperor's mercy; but here he was no sooner arrived than he was arrested, and sent prisoner to Charlemagne, who condemned him to perpetual banishment. The people gaining nothing by this expedient, continued to hold out for six weeks longer, when the king of Aquitain himself took the command of the siege. To him they made a proposal, that if he would allow them to march out, and go where they pleased, they would surrender the place. Lewis having agreed to this, made his public entry into Barcelona, where he formed a design of extending his father's dominions as far as the Ebro; but being recalled before he could put his design in execution, he appointed one Bera count of Barcelona. The city continued subject to him and his successors, who still enjoyed the title of *counts of Barcelona*, from the year 802 to 1131; during which time we find nothing remarkable, except that the city was once taken by the Moors, but soon after retaken by the assistance of Lewis IV. king of France. In 1131, it was united to the crown of Arragon by the marriage of Don Raymond V. count of Barcelona with the daughter of Don Ramiro the Monk, king of Arragon. In 1465, the Catalonians revolted against Don Juan II. king of Arragon, out of hatred to his queen Donna Juanna; the consequence of which was, that Barcelona was besieged by that monarch in 1471. Various efforts were made by Lewis XI. of France, and the duke of Lorraine, in order to raise the siege, but without effect. Things at length were brought to the utmost extremity, when the king offered to pardon them all, without the smallest punishment either in person or property, provided they would submit: but these terms they rejected, chiefly through the influence of the count de Pallars, who had been pardoned the year before. The army, on the other hand, was very earnest in being led on to the assault, in hopes of plunder. The king, however, wrote a letter to the citizens, dated the 6th of October, in terms as affectionate as if he had been writing to his children, bewailing the miseries they had brought on themselves, and concluding with a protestation, that they, and not he, must be answerable for the consequences. Upon this, at the persuasion of a priest who had a reputation for sanctity, they sent deputies to the king, and made a capitulation on the 17th of the same month. In this the king acknowledged they had taken up arms on just motives; and forgave every body except Pallars, who was, however, suffered to escape. On the 22^d of October the king made his entry into the city, and confirmed all their ancient privileges. In 1697, Barcelona was taken by the French, after a bloody siege of 52 days; and the loss of this city had a considerable effect in disposing the Spaniards to agree to the treaty of Ryfwick. In Queen Anne's time it was taken by the allies under the earl of Peterborough; but being afterwards shamefully denied assistance by the English ministry, was obliged to submit to Philip V. by whom the whole province was deprived of its ancient privileges; for a particular account of which, see the article SPAIN.

Barcelona is situated by the sea-side, of a form between a square and an oval; it is surrounded with a good brick wall, round which is another, with 14 bastions, horn-works, ramparts, and ditches; the ramparts are high, broad, and spacious, inasmuch that an hundred coaches may be seen every evening driving thereon for pleasure.

The city is divided into two parts, the Old and the New, which are separated from each other by a wall and a large ditch; the streets are handsome, well paved with large stones, wide, and very clean. It is the residence of a viceroy, is a bishop's see, has a fine university, a mint, a good port, and is adorned with handsome buildings. Here is a court of inquisition, which the inhabitants look upon as an advantage. The remarkable buildings are the cathedral, which is large, handsome, and adorned with two high towers, the church of the Virgin Mary, the palace of the bishop, that of the inquisition, and several religious houses: add to these the palace of the viceroy; the arsenal, which contains arms for 1000 men; the exchange, where the merchants meet; the *terfana*, where they build the galleys; and the palace where the nobility of the country meet, called *La Casa de la Deputation*. This last is built with fine large free stone, and adorned with columns of marble: there is in it a large hall, with a gilt ceiling, and a handsome portico, wherein persons may either walk or sit; the hall is adorned with the portraits of all the counts of Barcelona. There are several fine squares, particularly that of St Michael, into which all the great streets run. The port is wide, spacious, deep, and safe: defended on the one side by a great mole, and on the other sheltered from the west wind by two mountains, that advance into the sea, and form a kind of promontory: the mole is 750 paces long, with a quay, at the end of which is a light-house, and a small fort. One of the mountains, called *Mount Joy*, is very high, and rises in the middle of the plain near the city: it is covered with gardens, vineyards, groves of trees, and has a strong fort for the defence of the city: this mountain being a rock, yields an inexhaustible quarry of fine hard free stone. Barcelona is a place of great trade, on account of the convenience of its harbour; and it has a manufacture of knives greatly esteemed in Spain, as also of blankets. Here are also several glass-houses. The inhabitants are diligent, and equally fit for labour and trade; they are also very civil to strangers. The women are well shaped, and as handsome as any in Spain; they are brisk and lively in their conversation, and more free and unrestrained in their behaviour than in other parts of Spain. E. Long. 2. 5. N. Lat. 41. 26.

BARCELONETTA, a town of France in the government of Dauphiny, and capital of the valley of its own name. It belonged to the duke of Savoy, and was ceded to France by the treaty of Utrecht in 1712. E. Long. 6. 40. N. Lat. 44. 26.

BARCELOR, a town of Asia, in the East Indies, on the coast of Malabar. It is a Dutch factory, where they carry on a considerable trade in pepper. E. Long. 74. 15. N. Lat. 13. 45.

BARCELOS, a town of Portugal, with the title of a duchy. It is seated on the river Cavado, over which there is a handsome bridge. W. Long. 7. 0. N. Lat. 41. 20.

BARCINO, (anc. geogr.) a town of the Terraconensis in Spain, and capital of the Lalelani. Now *Barcelona*. See that article.

BARCLAY (Alexander), a learned monk in the reign of Henry VIII. Where he was born, though of no great importance, was nevertheless a matter of virulent contention among his former biographers.

Bale.

Barcelon.
Barclay.

Barclay.

Bale, who was his cotemporary, is of opinion he was born in Somersetshire. There is indeed a village of his name, and a numerous family, in that county. Pits thinks he was born in Devonshire. Mackenzie is positive he was a Scotchman; but without proof, unless we admit as such his name, *Alexander*. He was, however, educated in Oriel college, Oxford. After leaving the university, he went abroad, and continued some time in France, Italy, and Germany, where he acquired a competent knowledge of the languages of those countries, as appears from several translations of books, which he afterwards published. On his return to England, he was made chaplain to his patron the bishop of Tyne, who likewise appointed him a priest of St Mary, at the college of Ottery in Devonshire, founded by Grandison bishop of Exeter. After the death of his patron, he became a Benedictine monk of Ely. On the dissolution of that monastery, he first obtained the vicarage of St Matthew at Wokey, in Somersetshire; and, in 1549, being then doctor of divinity, was presented to the vicarage of Much Badew in Essex. In 1552, he was appointed rector of Allhallows, Lombard-street, which he lived to enjoy but a very short time. He died at Croydon in Surrey, in June 1552. He is generally allowed to have improved the English language, and to have been one of the politer writers of his time. He composed several original works; but was chiefly remarkable for his translations from the Latin, Italian, French, and German languages. His version from Sallust of the war of Jugurtha is accurate, and not without elegance. His lives of several saints, in heroic verse, are still unpublished. His *Stultifera navis*, or *The ship of fools*, is the most singular of his performances. It was printed by Richard Pynson at London 1509, in folio; and contains a variety of wooden plates, which are worthy the inspection of the curious.

BARCLAY (William), a learned Civilian, was born in Aberdeenshire in the year 1541. He spent the early part of his life, and much of his fortune, at the court of Mary Queen of Scots, from whose favour he had reason to expect preferment. In 1573, he went over to France, and at Bourges commenced student of civil law under the famous Cujacius. He continued some years in that seminary, where he took a doctor's degree; and was soon after appointed professor of civil law in the university of Pont-à-Mousson, then first founded by the duke of Lorraine. That prince afterwards made him counsellor of state, and master of requests. Barclay, in the year 1581, married Ann de Mallaville, a French lady, by whom he had a son, who became a celebrated author, and of whom the reader will find an account in the next article. This youth the Jesuits would gladly have received into their society. His father refused his consent, and for that reason these disciples of Jesus soon contrived to ruin him with the duke his patron. Barclay now embarked for Britain, where king James I. offered him considerable preferment, provided he would become a member of the church of England: but, not chusing to comply, he returned to France in 1604; and, soon after his arrival, was appointed professor of civil law in the university of Angers, where he died the year following, and was buried in the Franciscan church. He was esteemed a learned civilian; and wrote elaborately in defence of the divine right of kings, in answer to Buchanan and others.

The titles of his works are, 1. *De regno et regali potestate*, &c. 2. *Commentarius in tit. pandectarum de rebus creditis, et de jurejurando*. 3. *De potestate papæ*, &c. 4. *Præmetia in vitam Agricola*.

BARCLAY (John), son of the former, was, as we have above mentioned, so great a favourite of the Jesuits, that they used all their efforts to engage him in their society. His father would not consent, and carried his son with him into England, who was already an author, for he had published *A commentary upon the Thebair of Statius*, and a Latin poem on the coronation of King James, and the first part of *Euphormio*, 1603. He returned to France with his father; and after his father's death went to Paris, and soon after came back to London: he was there in 1606. He published *The History of the Gun-powder Plot*, a pamphlet of six leaves, printed at Amsterdam. He published at London, in 1610, *An Apology for the Euphormio*, and his father's treatise *De potestate papæ*. And at Paris, 1612, he published a book intitled *Pietas*, in answer to cardinal Bellarmine, who had written against William Barclay's book concerning the power of the Pope. Two years after, he published *Icon Animorum*. He was invited to Rome by Pope Paul V. and received a great deal of civility from cardinal Bellarmine, though he had written against him. He died at Rome in 1621, while his *Argenis* was printing at Paris. This celebrated work has since gone through a great number of editions, and has been translated into most languages. M. de Peirese, who had the care of the first edition, caused the effigies of the author to be placed before the book; and the following distich, written by Grotius, was put under it:

*Genite Caledonius, Gallus natalibus, hic est,
Romani Romani qui ducti ore loqui.*

BARCLAY (Robert), one of the most eminent among the Quakers, the son of colonel David Barclay, descended of the ancient family of Barclays, was born at Edinburgh in 1648. He was educated under an uncle at Paris, where the Papists used all their efforts to draw him over to their religion. He joined the Quakers in 1669, and distinguished himself by his zeal and abilities in defence of their doctrines. In 1676, he published in Latin at Amsterdam his *Apology for the Quakers*; which is the most celebrated of his works, and esteemed the standard of the doctrine of the Quakers. The *Theses Theologicae*, which were the foundation of this work, and addressed to the clergy of what sort soever, were published before the writing of the *Apology*, and printed in Latin, French, High-Dutch, Low-Dutch, and English. The dedication of his *Apology* to king Charles II. is very remarkable for the uncommon frankness and simplicity with which it is written. Amongst many other extraordinary passages, we meet with the following: "There is no king in the world, who can so experimentally testify of God's providence and goodness; neither is there any who rules so many free people, so many true Christians; which thing renders thy government more honourable, thyself more considerable, than the accession of many nations filled with slavish and superstitious souls. Thou hast tasted of prosperity and adversity; thou knowest what it is to be banished thy native country, to be over-ruled as well as to rule and sit upon the throne; and being oppressed, thou hast reason to know how hateful the oppressor is both.

both to God and man : if, after all those warnings and advertisements, thou dost not turn unto the Lord with all thy heart, but forget him who remembered thee in thy distress, and give up thyself to follow lust and vanity, surely great will be thy condemnation."—He travelled with the famous Mr William Penn, through the greatest part of England, Holland, and Germany, and was every where received with the highest respect; for though both his conversation and behaviour were suitable to his principles, yet there was such liveliness and spirit in his discourse, and such serenity and cheerfulness in his deportment, as rendered him extremely agreeable to all sorts of people. When he returned to his native country, he spent the remainder of his life in a quiet and retired manner. He died at his own house at Ury, on the 3^d of October, 1690, in the 42^d year of his age.

BARCOCHEBAS, or rather **BARCOCHAB**, a Jewish impostor, whose real name was *Akiba*; but he took that of *Barcochab*, which signifies the *Son of a Star*; in allusion to the prophecy of Balaam, "There shall a star arise out of Jacob." He proclaimed himself the Messiah; and talking of nothing but wars, victories, and triumphs, made his countrymen rise against the Romans, by which means he was the author of a thousand disorders : he ravaged many places, took a great number of fortresses, and massacred an infinite multitude of people, and particularly the Christians. The emperor sent troops to Rufus, governor of Judea, to suppress the sedition. Rufus, in obedience, exercised a thousand cruelties, but could not finish his attempt. The emperor was therefore obliged to send Julius Severus, the greatest general of that time; who attained his end without a direct battle : he fell on them separately; cut off their provisions; and at last the whole contest was reduced to the siege of Bitter, in the 18th year of Hadrian. The impostor perished there. This war cost the Romans a great deal of blood.

BARANA, or **BURDOCK**. See **ARCTURUS**.

BARDA, the brother of the empress Theodora; and uncle of the famous Photius, is said to have had no other good quality besides that of loving the sciences and polite literature, which he established in the Eastern empire; for he was treacherous, cruel, and ambitious. In the year 856, he assassinated Theoctistes, general of the emperor Michael's forces, and obtained his post. At length he caused the disgrace of the empress Theodora; and St Ignatius, patriarch of Constantinople, reproaching him for his vices, he had him deposed in 858, in order to make room for Photius. Bardas was assassinated by Basilus the Macedonian, in 866.

BARDED, in heraldry, the same with caparisoned. **BARDESANISTS**, a sect of ancient heretics, thus denominated from their leader Bardesanes, a Syrian of Edessa in Mesopotamia. Bardesanes, born in the middle of the second century, became eminent, after his conversion to Christianity, for his zeal against heretics; against whom, we are informed by St Jerome and Eusebius, he wrote a multitude of books : yet had he the misfortune to fall, himself, into the errors of Valentinius, to which he added some others of his own. He taught, that the actions of men depend altogether on fate, and that God himself is subject to necessity. His followers went further, and denied the resurrection of the body, and the incarnation and death of our Sa-

viour; holding that these were only apparent or phantastical.

BARDEWICK, a town of Germany, in the circle of Lower Saxony and duchy of Lunenbourg; formerly a very large place; but being ruined in 1189, by the duke of Saxony, has never yet recovered itself. It is seated on the river Ilmeneau, in E. Long. 10. 6. N. Lat. 53. 40.

BARDS. The word *bard* being a primitive noun, neither derived nor compounded, it can neither be traced to its root, nor resolved into its parts. It signified one who was a poet by his genius and profession; and "who sung of the battles of heroes, or the heaving "breasts of love *."

The curiosity of man is great with respect to the transactions of his own species; and when such transactions are described in verse, accompanied with music, the performance is enchanting. An ear, a voice, skill in instrumental music, and, above all, a poetical genius, are requisite to excel in that complicated art. As such talents are rare, the few that possessed them were highly esteemed; and hence the profession of a bard, which, beside natural talents, required more culture and exercise than any other known art. Bards were capital persons at every festival and at every solemnity. Their songs, which, by recording the achievements of kings and heroes, animated every hearer, must have been the entertainment of every warlike nation. We have Hesiod's authority, that in his time bards were as common as potters or joiners, and as liable to envy. Demodocus is mentioned by Homer as a celebrated bard; and Phemius, another bard, is introduced by him deprecating the wrath of Ulysses in the following words :

"O king! to mercy be thy soul inclin'd,
"And spare the poet's ever-gentle kind.
"A deed like this thy future fame would wrong,
"For dear to gods and men is sacred song.
"Self-taught I sing; by heav'n, and heav'n alone,
"The genuine feels of poetry are sown;
"And (what the gods bestow) the lofty lay,
"To gods alone, and godlike worth, we pay.
"Save then the poet, and thyself reward;
"Tis thine to merit, mine is to record." *ODYSSEY*, viii.

Cicero reports, that at Roman festivals, anciently, the virtues and exploits of their great men were sung. The same custom prevailed in Peru and Mexico, as we learn from Garcilasso and other authors. We have for our authority Father Gobien, that even the inhabitants of the Marian islands have bards, who are greatly admired, because in their songs are celebrated the feats of their ancestors.

But in no part of the world did the profession of bard appear with such lustre as in Gaul, in Britain, and in Ireland. Wherever the Celts or Gauls are mentioned by ancient writers, we seldom fail to hear of their druids and their bards; the institution of which, under two orders, was the capital distinction of their manners and policy. The druids were their philosophers and priests; the bards, their poets and recorders of heroic actions : and both these orders of men seem to have subsisted among them, as chief members of the state, from time immemorial. The Celts possessed, from very remote ages, a formed system of discipline and manners, which appears to have had a deep and lasting influence. Ammianus Marcellinus † gives them this express testimony, that there flourished among them the study of the most laudable arts; introduced

Bardewick,
Bards.

* *Officiis*
Poetis,
l. 37.

Kuims's
Sketches,
Sk. V.
sect. ii.

Blair's Dis-
ertation,
subjoined
to *Officiis*
Poetis,
Vol. II.
p. 306.

† *Lit. xv.*
c. 9.

by

Bards.

by the bards, whose office it was to sing in heroic verse the gallant actions of illustrious men; and by the druids, who lived together in colleges or societies, after the Pythagorean manner, and, philosophizing upon the highest subjects, asserted the immortality of the human soul. Tho' Julius Cæsar, in his account of Gaul, does not expressly mention the bards; yet it is plain, that, under the title of *Druids*, he comprehends that whole college or order; of which the bards, who, it is probable, were the disciples of the druids, undoubtedly made a part. It deserves remark, that, according to his account, the druidical institution first took rise in Britain, and passed from thence into Gaul; so that they who aspired to be thorough masters of that learning were wont to resort to Britain. He adds too, that such as were to be initiated among the druids, were obliged to commit to their memory a great number of verses, inasmuch that some employed twenty years in this course of education; and that they did not think it lawful to record these poems in writing, but sacredly handed them down by tradition from race to race.

So strong was the attachment of the Celtic nations to their poetry and their bards, that amidst all the changes of their government and manners, even long after the order of the druids was extinct, and the national religion altered, the bards continued to flourish; not as a set of strolling songsters, like the Greek *ᾠδοὶ* or *ῥαψωδιστῆς*, in Homer's time, but as an order of men highly respected in the state, and supported by a public establishment. We find them, according to the testimonies of Strabo and Diodorus, before the age of Augustus Cæsar; and we find them remaining under the same name, and exercising the same functions as of old, in Ireland, and in the north of Scotland, almost down to our own times. It is well known, that, in both these countries, every *regulus* or chief had his own bard, who was considered as an officer of rank in his court.

Of the honour in which the bards were held, many instances occur in Ossian's poems. On all important occasions, they were the ambassadors between contending chiefs; and their persons were held sacred. " Cairnor feared to stretch his sword to the bards, tho' his soul was dark. Loofe the bards, (said his brother Cathmor), they are the sons of other times. Their voice shall be heard in other ages, when the kings of Temora have failed."—The bards, as well as the druids, were exempted from taxes and military services, even in times of the greatest danger; and when they attended their patrons in the field, to record and celebrate their great actions, they had a guard assigned them for their protection. At all festivals and public assemblies they were seated near the person of the king or chieftain, and sometimes even above the greatest nobility and chief officers of the court. Nor was the profession of the bards less lucrative than it was honourable. For, besides the valuable presents which they occasionally received from their patrons when they gave them uncommon pleasure by their performances, they had estates in land allotted for their support. Nay, so great was the veneration which the princes of these times entertained for the persons of their poets, and so highly were they charmed and delighted with their tuneful strains, that they sometimes pardoned even their capital crimes for a song.

We may very reasonably suppose, that a profession that was at once so honourable and advantageous, and enjoyed so many flattering distinctions and desirable immunities, would not be deserted. It was indeed very much crowded; and the accounts which we have of the numbers of the bards in some countries, particularly in Ireland, are hardly credible. We often read, in the poems of Ossian, of a hundred bards belonging to one prince, singing and playing in concert for his entertainment. Every chief bard, who was called *Allah Redan*, or *doctor in poetry*, was allowed to have 30 bards of inferior note constantly about his person; and every bard of the second rank was allowed a retinue of 15 poetical disciples.

Though the ancient Britons of the southern parts of this island had originally the same taste and genius for poetry with those of the north, yet none of their poetical compositions of this period have been preserved. Nor have we any reason to be surprized at this. For after the provincial Britons had submitted quietly to the Roman government, yielded up their arms, and had lost their free and martial spirit, they could take little pleasure in hearing or repeating the songs of their bards in honour of the glorious achievements of their brave ancestors. The Romans too, if they did not practise the same barbarous policy which was long after practised by Edward I. of putting the bards to death, would at least discourage them, and discountenance the repetition of their poems, for very obvious reasons. These sons of the song being thus persecuted by their conquerors, and neglected by their countrymen, either abandoned their country or their profession; and their songs being no longer heard, were soon forgotten.

It is probable that the ancient Britons, as well as many other nations of antiquity, had no idea of poems that were made only to be repeated, and not to be sung to the sound of musical instruments. In the first stages of society in all countries, the two sister-arts of poetry and music seem to have been always united; every poet was a musician, and sung his own verses to the sound of some musical instrument. This, we are directly told by two writers of undoubted credit, was the case in Gaul, and consequently in Britain, in this period.

" The bards (says Diodorus Siculus) sung their poems † Lib. v. to the sound of an instrument not unlike a lyre." † sect. 31.
" The bards, (according to Ammianus Marcellinus*) * Lib. xv. as above hinted), celebrated the brave actions of illustrious men in heroic poems, which they sung to the sweet sounds of the lyre." This account of these Greek and Latin writers is confirmed by the general strain, and by many particular passages, of the poems of Ossian.
" Beneath his own tree, at intervals, each bard sat down with his harp. They raised the song, and touched the string, each to the chief he loved †." † Vol. II. p. 112, 113.

The invention of writing made a considerable change in the bard profession. It is now an agreed point, that no poetry is fit to be accompanied with music, but what is simple: a complicated thought or description requires the utmost attention, and leaves none for the music; or, if it divide the attention, it makes but a faint impression †. The simple operas of Quinault bear away the palm from every thing of the kind composed by Boileau or Racine. But when a language, in its progress to maturity, is enriched with variety of phrases fit to express the most elevated thoughts, men of genius aspired

Dr. Bel. Gal. l. 6.

Ossian, l. 22.

Henry's History, Vol. I. p. 365.

Kaim's Sketches, ubi supra. † See the article Attention.

hardt
u
gain.

aspired to the higher strains of poetry, leaving music and song to the bards: which distinguished the profession of a poet from that of a bard. Homer, in a lax sense, may be termed a bard; for in that character he strolled from feast to feast. But he was not a bard in the original sense: he, indeed, recited his poems to crowded audiences; but his poems are too complex for music, and he probably did not sing them, nor accompany them with the lyre. The *Trovadores* of Provence were bards in the original sense; and made a capital figure in the days of ignorance, when few could read, and fewer write. In later times, the songs of the bards were taken down in writing, which gave every one access to them without a bard; and the profession sunk by degrees into oblivion. Among the Highlanders of Scotland, reading and writing in their own tongue is not common even at present; and that circumstance supported long the bard-profession among them, after being forgot among the neighbouring nations.

BARDT, a strong and rich town of Germany, in the duchy of Pomerania, with a castle and spacious harbour. It is subject to the Swedes; and is situated near the Baltic sea, in E. Long. 13. 20. N. Lat. 54. 23.

BARE, in a general sense, signifies *not covered*. Hence we say bare-headed, bare-footed, &c.

The Roman women, in times of public distress and mourning, went *bare-headed*, with their hair loose.—Among both Greeks, Romans, and Barbarians, we find a feast called *Nudipedalia*.—The Abyssinians never enter their churches, nor the palaces of kings and great men, but *bare-footed*.

BARE-foot Carmelites and Augustines, are religious of the order of St Carmel and St Austin, who live under a strict observance, and go without shoes, like the capuchins. There are also barefoot fathers of mercy. Formerly there were barefoot dominicans, and even barefoot nuns of the order of St Augustin.

BAREITH, a town of Germany in Franconia, in the margravate of Culembach, with a famous college belonging to the margrave of Brandenburg Bareith. E. Long. 11. 50. N. Lat. 50. 0.

BARENT (Diteric), an excellent painter, was born at Amsterdam, and was the son of a very industrious painter. He studied in Italy, and became the favourite disciple of Titian, with whom he lived a long time; but at length returned to Amsterdam, where he performed many extraordinary pieces. He died in 1582, aged 48.

BARFLEUR, a town of France, in Normandy, on the continent. It was ruined, and had its harbour filled up by the English in 1346. The Cape of that name is 12 miles east of Cherbourg, and near it part of the French fleet was destroyed in 1692. W. Long. 1. 6. N. Lat. 49. 40.

BARGAIN and **SALE**, a species of conveyance in the English law. It is a kind of a real contract, whereby the bargainer for some pecuniary consideration bargains and sells, that is, contracts to convey, the land of the bargainee; and becomes by such bargain a trustee for, or seized to the use of, the bargainee; and then the statute of uses completes the purchase: or, as it hath been well expressed, the bargain first vests the use, and then the statute vests the possession. But as

it was foreseen that conveyances, thus made, would want all those benefits of notoriety which the old common-law assurances were calculated to give; to prevent therefore clandestine conveyances of freeholds, it was enacted in the same session of parliament by statute 27 Hen. VIII. c. 16. that such bargains and sales should not enure to pass a freehold, unless the same be made by indenture, and enrolled within six months in one of the courts of Westminster-hall, or with the *custos rotulorum* of the county. Clandestine bargains and sales of chattel interests, or leases for years, were thought not worth regarding, as such interests were very precarious till about six years before; which also occasioned them to be overlooked in framing the statute of uses: and therefore such bargains and sales are not directed to be enrolled. But how impossible is it to foresee, and provide against, all the consequences of innovations! This omission has given rise to the species of conveyance by lease and release.*

* See Lease and Release.

BARGE (*bargie*, Dutch), a vessel or boat of state, furnished with elegant apartments, canopies, and cushions; equipped with a band of rowers, and decorated with flags and streamers: they are generally used for processions on the water, by noblemen, officers of state, or magistrates of great cities. Of this sort, too, we may naturally suppose the famous barge or galley of Cleopatra, which, according to Shakspeare,

Like a burnish'd throne
Burnt on the water: the poop was beaten gold:
Purple her sails; and so perfum'd, that
The winds were love-sick with them: the oars were silver,
Which to the tune of flutes kept time, and made
The water which they beat to follow faster,
As amorous of their strokes.—
At the helm
A seeming mermaid steer'd: the silken tackles
Swell'd with the touches of those flower-soft hands
That yarely 'form'd' their office.—

There are likewise other barges of a smaller kind, for the use of admirals and captains of ships of war. These are of a lighter frame, and may be easily hoisted into, and out of, the ships to which they occasionally belong.

BARGE, is also the name of a flat-bottomed vessel of burden, for lading and discharging ships, and removing their cargoes from place to place in a harbour.

BARGE-Couplers, in architecture, a beam mortised into another, to strengthen the building.

BARGE-Course, with bricklayers, a term used for that part of the tiling which projects over without the principal rafters, in all sorts of buildings where there is either a gable or a kirkin-head.

BARGHMASTER, **BARMER**, or **BAR-MASTER**, in the royal mines, the steward or judge of the barmote.—The bar-masser is to keep two great courts of barmote yearly; and every week a small one, as occasion requires.

BARGHMOTE, or **BARMOTE**, a court which takes cognizance of causes and disputes between miners.—By the custom of the mines, no person is to sue any miner for ore-debt, or for ore, or for any ground in variance, but only in the court of barmote, on penalty of forfeiting the debt, and paying the charges at law.

BARI, a very handsome and rich town of Italy, in the kingdom of Naples; the capital of Terra di Bari, and an archbishop's see. It is well fortified, is seated

Buge
Eari.

Bari
Bark.

on the gulph of Venice, and had formerly a good harbour, but it was destroyed by the Venetians. E. Long. 17. 40. N. Lat. 41. 31.

BARİ, or *Terra di Bari*, a territory of Italy in the kingdom of Naples, of which the abovementioned city is the capital. It is bounded on the north by the Capitanata, on the north-west by the Ulterior Principato, on the south by the Basilicata, on the south-east by the Terra de Otranto, and on the north-east by the gulph of Venice. It has no considerable river except the Offanto, which separates it from the Capitanata. The air is temperate; and the soil produces plenty of corn, fruit, and saffron: but there are a great many serpents, and spiders called *tarantulas* *. The principal towns are Bari the capital, Frani, Andria, Bavo, Bitonto, Conversano, Monopoli, Polignano, Barletta, and Malfetto. The two first are archiepiscopal, and all the rest episcopal.

BARILLIA, in the glass-trade, a sort of potashes imported from Spain, inferior in goodness to that of the Levant; called *polverine*, when loose, small, and in powder; and *rochetta*, when in hard rocky lumps.—The fritt made of these makes fine and clear crystal glass, especially that from the rochetta, or the pulverine in lumps; but the barillia of Spain, though it be usually fatter, yet makes not a glass so white, but usually inclining a little to a bluish colour.

BARING OF TREES, in agriculture, the taking away some of the earth about the roots, that the winter-rain and snow-water may penetrate farther into the roots. This is frequently practised in the autumn.

BARJOLS, a small populous town of Provence, in France. E. Long. 5. 23. N. Lat. 43. 35.

BARIUM, (anc. geogr.) a town of Apulia on the Adriatic; so called from the founders, who being expelled from the island Bora, built this town. It is now called *Bari*; see that article.

BARK, in the anatomy of plants, the exterior part of trees, corresponding to the skin of an animal. For its organisation, texture, &c. see the article **PLANTS**.

As animals are furnished with a panniculus adiposus, usually replete with fat, which invests and covers all the fleshy parts, and screens them from external cold; plants are encompassed with a bark replete with fatty juices, by means whereof the cold is kept out, and in winter-time the spiculae of ice prevented from fixing and freezing the juices in the vessels: whence it is, that some sorts of trees remain ever-green the year round, by reason their barks contain more oil than can be spent and exhaled by the sun, &c.

The bark has its peculiar diseases, and is infected with insects peculiar to it.—It appears from the experiments of M. Buffon, that trees stripped of their bark the whole length of their stems, die in about three or four years. But it is very remarkable, that trees thus stripped in the time of the sap, and suffered to die, afford timber heavier, more uniformly dense, stronger, and fitter for service, than if the tree had been cut down in its healthy state. Something of a like nature has been observed by Vitruvius and Evelyn.

The ancients wrote their books on bark, especially

of the ash and lime-tree, not on the exterior, but on the inner and finer bark called *phlyra*.

There are a great many kinds of barks in use in the several arts. Some in agriculture, and in tanning leather, as the oak-bark (A); some in physic, as the *quina* or jesuit's bark, mace, &c.; others in dyeing, as the bark of alder and walnut trees; others in spicery, as cinnamon, cassia lignea, &c.; and others for divers uses, as the bark of the cork-tree, &c.

In the East Indies, they prepare the bark of a certain tree so as to spin like hemp. After it has been beat and steeped in water, they extract long threads from it, which are something between silk and common thread; being neither so soft nor so glossy as silk, nor so rough and hard as hemp. They mix silk with it in some stuffs; and these are called *nillae*, and *cherquemolles*.

Of the bark of a species of mulberry-tree the Japanese make their paper. See **MURUS**.

In the island of O-Taheite, the natives make their cloth, which is of three kinds, of the bark of three different trees, the paper-mulberry above-mentioned, the bread-fruit tree, and the cocoa tree. (See **MORUS**, **BREAD-FRUIT TREE**, and **COCOS**.) That made of the mulberry is the finest and whitest, and worn chiefly by the principal people. It is manufactured in the following manner. When the trees are of a proper size, they are drawn up, and stripped of their branches; after which, the roots and tops are cut off: the bark of these rods being then slit up longitudinally, is easily drawn off; and, when a proper quantity has been procured, it is carried down to some running water, in which it is deposited to soak, and secured from floating away by heavy stones; when it is supposed to be sufficiently softened, the women servants go down to the brook, and, stripping themselves, sit down in the water, to separate the inner bark from the green part on the outside: to do this, they place the under side upon a flat smooth board, and with a kind of shell scrape it very carefully, dipping it continually in the water till nothing remains but the fine fibres of the inner coat. Being thus prepared in the afternoon, they are spread out upon plantain leaves in the evening; they are placed in lengths of about 11 or 12 yards, one by the side of another, till they are about a foot broad, and two or three layers are also laid one upon the other: care is taken that the cloth shall be in all parts of an equal thickness, so that if the bark happens to be thinner in any one particular part of one layer than the rest, a piece that is somewhat thicker is picked out to be laid over it in the next. In this state it remains till the morning, when great part of the water which it contained when it was laid out is either drained off or evaporated, and the several fibres adhere together, so as that the whole may be raised from the ground in one piece. It is then taken away, and laid upon the smooth side of a long piece of wood prepared for the purpose, and beaten by the women servants. The instrument used for this purpose is a square wooden club, having each of its four sides or faces marked, lengthways, with small grooves, or furrows, of different degrees

Bark.

See A-
ranea.

(A) The bark of the oak has been long used in tanning leather, and even thought essential to that operation: but a different substance has been lately discovered, which answers the purpose full as well, and may be procured at a much cheaper rate; we mean oak faw-duft, or the chips of oak reduced to powder. This valuable secret was lately purchased by the society for the encouragement of arts, &c.

Bark
King.

grees of fineness; those on one side being of a width and depth sufficient to receive a small pack-thread, and the others finer in a regular gradation, so that the last are not more than equal to sewing silk. They beat it first with the coarsest side of this mallet, keeping time like our smiths; it spreads very fast under the strokes, chiefly however in the breadth, and the grooves in the mallet mark it with the appearance of threads; it is successively beaten with the other sides, last with the finest, and is then fit for use. Of this cloth there are several sorts, of different degrees of fineness, in proportion as it is more or less beaten. The other cloth also differs in proportion as it is beaten; but they differ from each other in consequence of the different materials of which they are made. The bark of the breadfruit is not taken till the trees are considerably longer and thicker than those of the mulberry; the process afterwards is the same.—Of the bark, too, of a tree which they call *poorou* *, they manufacture excellent matting; but a coarse sort which serves them to sleep upon, and a finer to wear in wet weather. Of the same bark they also make ropes and lines, from the thickness of an inch to the size of a small pack-thread.

Bark
of the
Glaucus.

BARK, or *Jesuit's Bark*, is a name given by way of eminence to the quinquina, or cinchona *.

BARK, in navigation, a general name given to small ships; it is however peculiarly appropriated by seamen to those which carry three masts without a mizen top-sail. Our northern mariners, who are trained in the coal-trade, apply this distinction to a broad-sterned ship which carries no ornamental figure on the stern or prow.

Water-BARKS, are little vessels used in Holland for the carriage of fresh-water to places where it is wanting, as well as for the fetching sea-water to make salt of. They have a deck, and are filled with water up to the deck.

BARK-Binding, a distemper incident to trees; cured by slitting the bark, or cutting along the grain.

BARK-Galling, is when the trees are galled with thorns, &c. It is cured by binding clay on the galled places.

BARK-Longue, or *Barca Longa*, a small low sharp-built, but very long, vessel without a deck. It goes with sails and oars, and is very common in Spain.

BARKHAMSTEAD, or *BERKHAMSTEAD*, a town of Hertfordshire in England; formerly of more note than at present. It had formerly a strong castle built by the Normans, but it has been long since demolished. W. Long. c. 35. N. Lat. 45. 49.

BARKING, a town of Essex in England, seated on the river Roding, not far from the Thames, in a very unwholesome air. It has been chiefly noted for a large manufactory, now in ruins; there being nothing left standing but a small part of the walls, and a gatehouse. E. Long. c. 13. N. Lat. 51. 30.

BARKING of Trees; the peeling off the rind or bark. This must be done, in our climate, in the month of May, because at that time the sap of the tree separates the bark from the wood. It would be very difficult to perform it at any other time of the year, unless the season was extremely wet and rainy; for heat and dryness are a very great hindrance to it.

By the French laws, all dealers are forbid to bark their wood while growing, on the penalty of 500 livres.

Barkley
Barlaria.

This law was the result of ignorance; it being now found, that barking of trees, and letting them die, increases the strength of timber.

BARKLEY, a town of Gloucestershire in England, seated on a branch of the river Severn. It was formerly of some note for a nunnery, and has still the title of a barony. W. Long. 2. 30. N. Lat. 51. 40.

BARKWAY, a town of Hertfordshire in England, on the great road from London to York. W. Long. c. 5. N. Lat. 52.

BARLÆUS (Gaspard), professor of philosophy at Amsterdam, and one of the best Latin poets of the 17th century. There was scarce any thing great that happened in the world while he lived, but he made a pompous elegy upon it, when reasons of state were no obstacle to it. He was a great defender of Arminius; and shewed his abilities in history by his relation of what passed in Brazil during the government of count Maurice of Nassau, published 1647. He died the year after.

BARLERIA, (from Jacobus Barlier at Paris, a famous botanist), *SNAP-DRAGON*; a genus of the angiospermia order, belonging to the didynamia class of plants.

Species. 1. The *solanifolia*, with spear-shaped indented leaves, rises with upright square stalks three feet high, garnished with two leaves at every joint; above which the flowers come out in whorls surrounding the stalks; and under each whorl there are six sharp spines, which are as long as the empalement of the flowers. The joints are about three inches distance, and the flowers are blue. 2. The *prionites*, with spines growing by fours on the side of the branches, has been long in the gardens of the curious in Holland, but is only introduced into Britain of late. This sends out many slender stems from the root, which rise eight or nine feet high, garnished with oval pointed leaves, two growing opposite at each joint, which are attended by four long spines standing crosswise. This plant hath not yet flowered in England, though there are large plants of it in Chelsea garden. 3. The *buxifolia*, with roundish entire leaves, is a native of Jamaica. It hath shrubby stalks rising five or six feet high, garnished with roundish entire leaves placed opposite, under which are placed strong spines: the flowers are produced in whorls towards the upper part of the stalk, and are succeeded by short seed-vessels, containing three or four flat seeds. 4. The *Coccinea* is a native of the warm parts of America. The stalks are smooth, rise to the height of four feet, and are garnished with two oval indented leaves standing opposite; the flowers are of a scarlet colour, and placed in whorls at the joints of the stalks. They appear in July, August, and September, and are succeeded by short pods inclosing flat seeds.

Culture. All these plants, being natives of very warm countries, require to be kept in a stove, and must be treated like other tender exotics. The roots of the first species will continue three or four years; but after the second year, the plants grow too rambling, and the lower parts of the branches become naked; they should therefore be turned out every two years. This species is propagated by seeds. The second hath flexible perennial stalks, which if cut off during the summer months, and made into lengths of six or eight inches,

will soon put out roots when planted. The other two are propagated by seeds, and require no particular direction for their culture.

BARLETTA, a handsome and strong town of Italy, in the kingdom of Naples, and in the Terra di Bari, with a bishop's see. It is situated on the gulph of Venice, in E. Long. 16. 32. N. Lat. 41. 30.

BARLEY, in botany. See **HORDEUM**; and **AGRICULTURE**, n° 118.

The principal use of barley among us is for making beer; in order to which, it is first malted. See the article **BEER**.

The Spaniards, among whom malt-liquors are little known, feed their horses with barley, as we do with oats. In Scotland, barley is a common ingredient in broths; and the consumpf of it for that purpose is very considerable, *barley-broth* being a dish as frequent there, as that of *soup* in France.

Barley has likewise its use in medicine, on account of its cooling and absterfve qualities: hence, a decoction of barley, especially if a little nitre be dissolved in it, is greatly recommended in slow fevers.

BARLEY-corn, the least of our long measures, being the third of an inch.

BARLOW (William), bishop of Chichester, descended of an ancient family in Wales, was born in the county of Essex. In his youth he favoured the reformation; and travelled to Germany to be instructed by Luther, and other preachers of the new doctrine. How long he continued a Protestant is uncertain: but from his letter to king Henry VIII. quoted below, it appears that he wrote several books against the church of Rome. However, he was a regular canon in the Augustine monastery of St Osth in the county of Essex, and studied some time at Oxford with the brothers of that order, where he took the degree of doctor in divinity. He was then made prior of the convent at Bisham in Berkshire; and afterwards succeeded to the several priories of Blackmore, Typtree, Lega, Brom-hole, and Haverford-west. On the dissolution of abbeys, he resigned not only with a good grace, but persuaded several other abbots to follow his example. King Henry was so pleased with his ready obedience on this occasion, that he sent him, in 1535, on an embassy to Scotland; in the same year, made him bishop of St Asaph; in two months after, translated him to the see of St David's, and in 1547 to that of Bath and Wells. During this time, our good bishop, as appears from the following epistle to the king, was, or pretended to be, a staunch Papist; it was written in 1533. "Prayse be to God, who of his infynyte goodnes and mercy inestimable hath brought me out of darknes into light, and from deadly ignorance into the quick knowledge of the truth. From the whiche, through the fiend's instigation and false persuasion, I have greatly swerved.—In so much that I have made certayn bokes, and have sowed them to be emprinted, as the tretise of the *buryall of the masse*, &c. In these tretises I perceive and acknowledge myself grievously to have erred, namely against the blessed sacrament of the altare; disallowing the masse and denying purgatory, with slanderous infamy of the pope and my lord cardinal, and outrageous raylying against the clergy; which I have forsaken and utterly renounced.—Asks par-

"don, *William Barlow*." However, when Edward VI. came to the crown, he was again a Protestant; and for that reason, on queen Mary's accession, was deprived of his bishoprick, and sent prisoner to the fleet, where he continued some time. At length he found means to escape, and immediately joined the other English Protestants in Germany. When queen Elizabeth ascended the throne, our prelate was raised to the see of Chichester, and soon after made first prebendary of the collegiate church of Westminster. He died in 1568, and was buried in the cathedral at Chichester. He had five daughters, each of which married a bishop. He wrote, 1. *The buryall of the masse*. 2. *The climbing up of fryers and religious persons portred with figures*. 3. *Christian homilies*. 4. *A booke upon Cosmography*. 5. *The godly and pious institution of a Christian man, commonly called the bishop's booke*; and several other works. He is said to be the translator of the apocrypha as far as the booke of Wisdom. His letters to M. Parker are in manuscript in Corpus Christi college Cambridge, Misc. i. 445.

BARLOW (William), a mathematician and divine, the son of the bishop of Chichester, was born in Pembroke-shire whilst his father was bishop of St David's. In 1560, he was entered commoner of Baliol college in Oxford; and in 1564, took a degree in arts, which having completed by determination, he left the university and went to sea; but in what capacity is uncertain: however, he acquired considerable knowledge in the art of navigation. About the year 1573, he entered into orders; and became prebendary of Winchester, and rector of Easton near that city. In 1588, he was made prebendary of Litchfield, which he exchanged for the place of treasurer of that church. Some years after, he was made chaplain to prince Henry, the son of king James I.; and in 1614, archdeacon of Salisbury. He was the first writer on the nature and properties of the magnet. Barlow died in the year 1625, and was buried in the church at Easton. His works are, 1. *The navigator's supply, containing many things of principal importance belonging to navigation, and use of diverse instruments framed chiefly for that purpose*. Lond. 1597, 4to. Dedicated to Robert earl of Essex. 2. *Magnetical advertisements, or diverse pertinent observations and approved experiments concerning the nature and properties of the loadstone*. Lond. 1616, 4to. 3. *A brief discovery of the idle animadversions of Mark Ridley, M. D. upon a treatise entitled Magnetical advertisements*. Lond. 1618, 4to.

BARLOW (Thomas), born in 1607, was appointed fellow of Queen's college in Oxford in 1633; and two years after was chosen reader of metaphysics to the university. He was keeper of the Bodleian library, and in 1657 was chosen provost of Queen's college. After the restoration of king Charles II. he was nominated one of the commissioners for restoring the members unjustly expelled in 1648. He wrote at that time *The case of Toleration in matters of Religion*, to Mr R. Boyle. In 1675, he was made bishop of Lincoln. After the popish plot, he published several tracts against the Roman-catholic religion; in which he shews an uncommon extent of learning, and skill in polemical divinity. Nevertheless, when the duke of York was proclaimed king, he took all opportunities of expressing his affection toward him; but after the revolution he as readily

voted

voted that the king had abdicated his kingdom; and was very vigorous in excluding those of the clergy who refused the oaths, from their benefices.

Mr Granger observes, that "this learned prelate, whom nature designed for a scholar, and who acted in conformity with the bent of nature, was perhaps as great a master of the learned languages, and of the works of the celebrated authors who have written in those languages, as any man of his age. The greatest part of his writings, of which Mr Wood has given us a catalogue, are against Popery; and his conduct for some time, like that of other Calvinists, appeared to be in direct opposition to the church of Rome. But after James ascended the throne, he seemed to approach much nearer to Popery than he ever did before. He sent the king an address of thanks for his declaration for liberty of conscience, and is said to have written reasons for reading that declaration. His compliances were much the same after the revolution. His moderation, to call it by the softest name, was very great; indeed too great, as to bring the firmness of his character in question. But casuistry, which was his most distinguished talent, not only reconciles seeming contradictions, but has also been known to admit contradictions themselves. He was, abstracted from this laxity of principles, a very great and worthy man." He died at Buckden, in Huntingdonshire, on the 8th of October 1691, in the 85th year of his age.

BARLOW (Francis), an eminent English painter, was born in Lincolnshire. On his coming to London, he was placed with one Shepherd, a limner; but his genius led him chiefly to drawing of birds, fish, and other animals. There are six books of animals from his drawings, and he painted some ceilings with birds for noblemen and gentlemen in the country.—His etchings are numerous; his illustration of *Esoy* is his greatest work. He died in 1702.—There is something pleasing in the composition and manner of this master, though neither is excellent. His drawing too is very indifferent; nor does he characterize any animal justly. His birds in general are better than his beasts.

BARM, the same with yeast. See YEST.—Barm is said to have been first used by the Celts in the composition of bread. About the time of Agricola's entrance into Lancashire, a new sort of loaf had been introduced at Rome; which was formed only of water and flour, and much esteemed for its lightness: and it was called the *water cake* from its simple composition, and the *Parthian roll* from its original inventors. But even this was not comparable to the French or Spanish bread for its lightness. The use of curm^t, and the knowledge of brewing, had acquainted the Celts with an ingredient for their bread, which was much better calculated to render it light and pleasing, than the leaven, the eggs, the milk, or the wine and honey, of other nations. This was the fumee which arose on the surface of their curw in fermentation, and which the Welch denominate *burn*, and we *barm*. The Celtes of Gaul, of Spain, and most probably therefore of South-Britain, had long used it; and their bread was, in consequence of this, superior in lightness to that of any other nation in the world*. See the articles BAKING and BREAD.

BARMAS, an East Indian people, who in 1515 possessed all the coast extending from Bengal to Pegu.

It appears also, that they were formerly masters of Ava, the dominions of which extended as far as China; and of consequence the Barmas were masters of most of the northern part of the peninsula beyond the Ganges. Their dominions, however, were afterwards reduced to very narrow bounds, and their king became tributary to him of Pegu; but by degrees they not only recovered their former empire, but conquered the kingdoms of Pegu, Siam, and several others. By the latest accounts, their kingdom extends from the province of Yun-nan in China, about 800 miles in length from north to south, and 250 in breadth from east to west. See the article PEGU.

ST BARNABAS'S DAY, a Christian festival, celebrated on the 11th of June.—St Barnabas was born at Cyprus, and descended of the tribe of Levi, whose Jewish ancestors are thought to have retired thither to secure themselves from violence during the troublesome times in Judea. His proper name was *Joset*; to which, after his conversion to Christianity, the apostles added that of *Barnabas*, signifying either the *son of prophecy*, or the *son of consolation*; the first respecting his eminent prophetic gifts, the other his great charity in selling his estate for the comfort and relief of the poor Christians. He was educated at Jerusalem, under the great Jewish doctor Gamaliel; which might probably lay the foundation of that intimate friendship which was afterwards contracted between this apostle and St Paul. The time of his conversion is uncertain; but he is generally esteemed one of the seventy disciples chosen by our Saviour himself*.

At Antioch, St Paul and St Barnabas had a contest, which ended in their separation; but what followed it, with respect to St Barnabas, is not related in the *Acts of the Apostles*. Some say, he went into Italy, and founded a church at Milan. At Salamis, we are told, he suffered martyrdom; whither some Jews, being come out of Syria, set upon him, as he was disputing in the synagogue, and stoned him to death. He was buried, by his kinsman Mark, whom he had taken with him, in a cave near that city. The remains of his body are said to have been discovered in the reign of the emperor Zeno, together with a copy of St Matthew's gospel, written with his own hand, and lying on his breast.

St BARNABAS'S *Epistle*, an apocryphal work ascribed to St Barnabas, and frequently cited by St Clement of Alexandria and Origen.—It was first published in Greek, from a copy of father Hugh Menard a Benedictine monk. An ancient version of it was found in a manuscript of the abbey of Corbeey, near a thousand years old. Vossius published it, in the year 1656, together with the epistles of St Ignatius.

St BARNABAS'S *Gospel*, another apocryphal work, ascribed to St Barnabas the apostle, wherein the history of Jesus Christ is related in a manner very different from the account given us by the four Evangelists. The Mahometans have this gospel in Arabic, and it corresponds very well with those traditions which Mahomet followed in his Koran. It was, probably, a forgery of some nominal Christians; and afterwards altered and interpolated by the Mahometans, the better to serve their purpose.

BARNABITES, a religious order, founded in the 16th century by three Italian gentlemen, who had been

Barnabas,
Barnabites.

* See further
Acts
ix. xi. xiii.
xiv. xv.

See *Act.*

Pliny, lib.
iii. c. 7.

advised by a famous preacher of those days to read carefully the epistles of St Paul. Hence they were called *clerks of St Paul*; and *Barnabites*, because they performed their first exercise in a church of St Barnabas at Milan. Their habit is black; and their office is to instruct, catechise, and serve in mission.

* See *Anst.*

BARNACLE, in ornithology, a species of goose *. **BANACLES**, in fariery, an instrument composed of two branches joined at one end with a hinge, to put upon horses noses when they will not stand quietly to be shod, blooded, or dressed.

BARNARD, or **BERNARD**, (John), the son of John Barnard, gent. was born at Caistor, in Lincolnshire, and educated at Cambridge. After several preferments, he was made a prebendary of the church of Lincoln. He wrote *Centuria Clerici*, against scandalous ministers not fit to be restored to church livings; the Life of Dr Heylyn; and a few other works. He died at Newark, August 17. 1683.

BARNARD-CASTLE, a town of the county of Durham, in England, seated on the river Tees. It is indifferently large, and has a manufacture of stockings. W. Long. 1. 45. N. Lat. 54. 35.

BARNES (Joshua), professor of the Greek language at Cambridge, in the beginning of the 18th century. He was chosen queen's professor of Greek in 1695, a language he wrote and spoke with the utmost facility. His first publication was a whimsical tract, intitled *Gerania, or a new Discovery of the little sort of people called Pigmies*. After that appeared his *Life of Edward III.* in which he introduces his hero making long and elaborate speeches.—In the year 1700, when he published many of his works, Mrs Mason, of Hemmingsford, in Huntingdonshire, a widow lady of between 40 and 50, with a jointure of L. 200 *per annum*, who had been for some time a great admirer of him, came to Cambridge, and desired leave to settle L. 100 a-year upon him after her death; which he politely refused, unless she would likewise condescend to make him happy with her person, which was not very engaging. The lady was too obliging to refuse any thing to Joshua, for whom, she said, “the sun stood still;” and they were accordingly married. Mr Barnes wrote several other books besides those abovementioned, particularly, *Sacred poems; The Life of Oliver Cromwell, the Tyrant; several dramatic pieces; A poetical Paraphrase on the History of Esther, in Greek verse*, with a Latin translation, &c.; and he published editions of *Enripides, Anacreon, and Homer's Iliad and Odyssey*, with notes and a Latin translation. He wrote with greater ease in Greek than even in English, and yet is generally allowed not to have understood the delicacies of that language. He was of such a humane disposition, and so unacquainted with the world, that he gave his only coat to a vagrant begging at his door. This excellent man died on the 3^d of August 1712, in the 58th year of his age.

BARNEVELDT (John d' Olden), the celebrated Dutch statesman, and one of the founders of the civil liberty of Holland. His patriotic zeal inducing him to limit the authority of Maurice prince of Orange the second stadtholder of Holland, the partisans of that prince falsely accused him of a design to deliver his country into the hands of the Spanish monarch. On this absurd charge he was tried by 26 commissaries

deputed from the seven provinces, condemned, and beheaded in 1619. His sons William and René, with a view of revenging their father's death, formed a conspiracy against the stadtholder, which was discovered. William fled: but René was taken and condemned to die; which fatal circumstance has immortalized the memory of his mother, of whom the following anecdote is recorded. She solicited a pardon for René; upon which Maurice expressed his surprise that she should do that for her son, which she had refused for her husband. To this remark, she replied with indignation, “I would not ask a pardon for my husband, because he was innocent. I solicit it for my son, because he is guilty.”

BARNET, a town partly in Middlesex, and partly in Hertfordshire. It is a great thorough-fare, and the market is very remarkable for hogs. W. Long. o. 5. N. Lat. 51. 42.

BARNSELEY, or **BLACK BARNSELEY**, a town of the west riding of Yorkshire, seated on the side of a hill, and five furlongs in length. W. Long. 1. 20. N. Lat. 53. 35.

BARNSTABLE, a sea-port town of Devonshire, seated on the river Tau, over which there is a good bridge. It is a corporation town, and sends two members to Parliament. W. Long. 4. 5. N. Lat. 51. 15.

BARO, or **BARON**, (Peter), professor of divinity in the university of Cambridge, in the 16th century, was born at Estampes in France, and educated in the university of Bourges, where he was admitted a licentiate in the law: but being of the Protestant religion, he was obliged to leave his native country to avoid persecution; and, withdrawing into England, was kindly entertained by lord Burleigh. He afterwards settled at Cambridge; and, by the recommendation of his noble patron, was, in 1574, chosen lady Margaret's professor there. For some years he quietly enjoyed his professorship: but there was at last raised a restless faction against him, by his opposing the doctrine of absolute predestination; which rendered his place so uneasy to him, that he chose to leave the university, and to settle in London. He wrote, 1. *In Jonam Prophetam Prælectiones* xxxix. 2. *De Præstantia & Dignitate Divine Legis*; and other pieces. He died in London, about the year 1600.

BAROCCI (Frederic), a celebrated painter, was born at Urbin, where the genius of Raphael inspired him. In his early youth he travelled to Rome; where he painted several things in fresco. He then returned to Urbino; and giving himself up to intense study, acquired a great name in painting. His genius particularly led him to religious subjects. At his leisure hours, he etched a few prints from his own designs; which are highly finished, and executed with great softness and delicacy. The *salutation* is his capital performance; of which we seldom meet with any impressions, but those taken from the retouched plate, which are very harsh. He died at Urbino in 1612, aged 84.

BAROCHE; a town of Cambaya, in the dominions of the Great Mogul; it is walled round, and was formerly a place of great trade. It is now inhabited by weavers, and such mechanics as manufacture cotton cloth. Here they have the best cotton in the world, and of consequence the best bastas are manufactured in this place. The English and Dutch had formerly factories

ories here, which are now abandoned. E. Long. 72. 5. N. Lat. 22. 15.

BAROCO, in logic, a term given to the fourth mode of the second figure of syllogisms. A syllogism in baroco has the first proposition universal and affirmative, but the second and third particular and negative, and the middle term is the predicate in the two first propositions. For example,

Nullus homo non est bipes:

Non omne animal est bipes:

Non omne animal est homo.

BAROMETER, (from *bag* weight, and *metron* measure), an instrument for measuring the weight of the atmosphere, and of use in foretelling the changes of the weather, and also for measuring the height of mountains, &c.

The common barometer consists of a glass tube hermetically sealed at one end, and filled with quicksilver well defecated and purged of its air. The finger being then placed on the open end, in immediate contact with the mercury, so as not to admit the least particle of air, the tube is inverted, and the lower end plunged into a basin of the same prepared mercury; then, upon removing the finger, the mercury in the tube will join that in the basin, and the mercurial column in the tube will subside to the height of 29 or 30 inches, according to the state of the atmosphere at that time. This is the principle on which all barometers are constructed. Of their invention, the different kinds of them, and the theories by which their phenomena are solved, we shall proceed to give an historical account.

In the beginning of the last century, when the doctrine of a plenum was in vogue, philosophers were of opinion, that the ascent of water in pumps was owing to the abhorrence of a vacuum; and that, by means of suction, fluids might be raised to any height whatever. But Galileo, who flourished about that time, discovered that water would not ascend in a pump unless the sucker reached within 33 feet of its surface in the well. From hence he concluded, that not the power of suction, but the pressure of the atmosphere was the cause of the ascent of water in pumps; that a column of water 33 feet high was a counterpoise to one of air of an equal base, whose height extended to the top of the atmosphere; and that for this reason the water would not follow the sucker any farther. From this Torricelli, Galileo's disciple, took the hint; and considered, that if a column of water of about 33 feet in height was equal in weight to one of air having the same base, a column of mercury no longer than about 29½ inches would be so too, because mercury being about 14 times heavier than water, a column of mercury must be 14 times shorter than one of water equally heavy. Accordingly, having filled a glass tube with mercury, and inverted it into a basin of the same, he found the mercury in the tube to descend till it stood about 29½ inches above the surface of that in the basin.

Notwithstanding this clear proof of the pressure of the atmosphere, however, the assertors of a plenum left no means untried to solve the phenomena of the Torricellian experiment by some other hypothesis. The most ridiculous solution, and which at the same time gave the adverse party the greatest difficulty to overthrow it, was that of Linus. He contended, that, in the upper part of the tube, there is a film, or rope of mercury, ex-

tended through the seeming vacuity; and that, by this rope, the rest of the mercury was suspended, and kept from falling into the basin. Even this so absurd hypothesis he pretended to confirm by the following experiments. Take, says he, a small tube, open at both ends, suppose about 20 inches long; fill this tube with mercury, stopping the lower orifice with your thumb: Then closing the upper end with your finger, and immersing the lower in stagnant mercury, you shall perceive, upon the removal of your thumb, a manifest suction of your finger into the tube; and the tube and mercury will both stick so close to it, that you may carry them about the room. Therefore, says he, the internal cylinder of mercury in the tube is not held up by the preponderant air without; for if so, whence comes so strong a suction, and so firm an adhesion of the tube to the finger?—The same effect follows, though the tube be not quite filled with mercury; for if a little space of air is left at the top, after the tube is immersed in the stagnant mercury, there will be a considerable suction as before.

These experiments, which are themselves clear proofs of the pressure of the air, supported for some time the *funicular* hypothesis, as it was called, of Linus. But when it was discovered, that if the tube was carried to the top of an high mountain the mercury stood lower than on the plain, and that if removed into the vacuum of an air-pump it fell out altogether, the hypothesis of Linus was rejected by every body.—There are, how-

ever, two experiments which create a considerable difficulty. One is mentioned by Mr Huygens, viz. that if a glass tube 75 inches long, or perhaps longer, is filled with mercury well purged of its air, and then inverted, the whole will remain suspended; whereas, according to the Torricellian experiment, it ought to subside immediately to the height of 29 or 30 inches. It is true indeed, that, upon shaking the tube, the mercury presently subsides to that height; but why it should remain suspended at all, more than twice the height to which it can be raised by the pressure of the most dense atmosphere, seems not easily accounted for; and accordingly, in the Philosophical Transactions, we find attempts to account for it by the pressure of a medium more subtle than the common air, and capable of pervading both the mercury and glass. We find there also another very surprising fact of the same kind mentioned; viz. that a pretty large tube under 29 inches in length, filled with mercury, and inverted into a basin of the same, will remain full, though there be a small hole in the top. This, too, is there accounted for by the pressure of a medium more subtle than common air; but by no means in a satisfactory manner. Mr Rowning, who mentions the phenomenon of the 75 inch tube, accounts for it in the following manner. “The cause of this phenomenon seems to be, that by the great weight of so long a column of mercury, it was pressed into so close contact with the glass in pouring in, that, by the mutual attraction of cohesion between the mercury and the glass, the whole column was sustained after the tube was inverted.”—Here, however, we must observe, that this solution seems equally unsatisfactory with that of the subtle medium already mentioned; because it is only one end of the column which sustains so great a pressure from the weight of the mercury; and therefore, though five or six inches of the upper part of

Barometer.

4
Experiments
in confirma-
tion of it.

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Refuted.

6
Remark-
able experi-
ments by
Mr Huy-
gens.

7
Unsatisfac-
torily ac-
counted for
in the Philo-
sophical
Transactions.

9
Mr Row-
ning's solu-
tion.

9
Insufficient.

the

Barometer.

The tube, where the pressure had been strongest, might thus remain full of mercury, yet the rest ought to fall down. Besides, it is only the outside of the mercurial column that is in contact with the glass, and consequently these parts only ought to be attracted. Therefore, even granting the pressure to be equally violent, on the inversion of the tube, all the way from 29 to 75 inches, yet the glass ought to be only as it were silvered over by a very thin film of mercury, while the middle parts of the column ought to fall out by reason of their fluidity.

30
Another
experiment
with si-
phons.

The other experiment hinted at, is with regard to siphons: which though it belongs more properly to the article *HYDROSTATICS*, yet seems necessary to be mentioned here. It is this: That a siphon, once set a running, will continue to do so though set under the receiver of an air-pump and the air exhausted in the most perfect manner; or if a siphon is filled, and then set under a receiver and the air exhausted, if by any contrivance the end of the lower leg is opened, it will immediately begin to run, and discharge the water of any vessel in which the other leg is placed, as though it was in the open air. The cause of this phenomenon, as well as the former, seems very difficult to be investigated. In Chambers's Dictionary, under the word *Siphon*, we have a solution something similar to the funicular hypothesis of Linus abovementioned; namely, that "fluids in siphons seem as it were to form one continued body; so that the heavier part, descending, like a chain pulls the lighter after it." This might be deemed a sufficient explication, if the siphon was only to empty the water it at first contains in itself: but when we consider that the water in the vessel, which much exceeds the quantity contained in the siphon, is likewise evacuated, Mr Chambers's hypothesis can by no means be admitted; because this would be like the lighter part of a chain pulling the heavier after it.

31
Solution by
Mr Cham-
bers.

32
Insufficient.

Concerning the cause of these singular phenomena, we can only offer the following conjecture. The existence of a medium much more subtle than air, and which pervades the vacuum of an air-pump with the utmost facility, is now sufficiently ascertained in the phenomena of electricity. It is also well known, that this fluid surrounds the whole earth to an indeterminate height. If therefore this fluid either is the power of gravity itself, or is acted upon by that power, it must necessarily press upon all terrestrial bodies in a manner similar to the pressure of the atmosphere. If then we could from any vessel entirely exclude this subtle fluid, and form an electrical vacuum, as well as we can do an aerial one by means of the air-pump, we would in that case see fluids as evidently raised by the pressure of the electric matter, as we now see them raised by that of the air. But tho' this cannot be done, we are assured that there are certain substances, of which glass is one, through which the electric matter cannot pass but with difficulty. We are likewise certain, that tho' the electric matter passes through the pores of water, metals, &c. with very great facility, yet it still must meet with some resistance from their solid and impenetrable parts, which cannot be pervaded by any material substance. We know also, that all substances do naturally contain a certain quantity of this electric matter, which they are not always ready to part with; and when by any means the fluid they contain is set in mo-

tion, they are then said to be *electricized*. Now, though we are certain, that the friction of glass by mercury does set in motion the electric fluid contained in the mercury, or in the glass; yet, when the tube is filled with the metallic fluid, whatever quantity has been extricated, either from the glass or mercury, during the time of filling, will be reabsorbed by the metal, and conveyed to the earth, during the time of inversion; and consequently the mercurial tube, when inverted, will not be electricized, but both glass and mercury will be in their natural state. Here, then, the pressure of the electrical fluid is kept off in some measure from the upper part of the mercury by the glass, which it cannot penetrate, easily at least. To the mercury in the basis it has free access, and therefore presses more upon the lower than the upper part; the consequence of which is a suspension of the mercury. It is true, this fluid very easily penetrates the metallic matter; but it must be considered, that the electric fluid itself is in some measure entangled in the particles of the quicksilver, and cannot be extricated without motion. As soon therefore as the tube is shaken, some part of the electricity is extricated, and the mercury begins to descend. The subtilty of the medium is such, that no sooner has it begun to extricate itself, than, by the motion of the metal downwards, it issues forth in great quantities, so as to become visible, like a blue flame, in the dark. The equilibrium is therefore destroyed in an instant, as it would be were we to admit air to the top of the barometer; nay, in a more effectual manner. For if a small quantity of air was admitted to the top of a barometer, the mercury would only descend in proportion to the quantity of air admitted; but here, no sooner is a quantity of electric matter admitted, than it procures admission for a vast deal more, and consequently the mercury descends with accelerated velocity.—On this principle the ascent of water in the siphon while *in vacuo* is so easily accounted for, that we need not take up time in explaining it farther.—But why an inverted glass tube should remain full of mercury when it has a hole either great or small in the top, is more difficult to be accounted for, and requires this farther circumstance to be taken into consideration, viz. that though all solid bodies will, by the action of gravity, or by any other impulse, easily approach very near to one another, yet they cannot be brought into absolute contact without a very considerable force, much greater than is sufficient to overcome their gravity; and thus it appears from some experiments, that the links of a chain are by no means in contact with one another, till the chain has a considerable weight appended to it. This may be the case with the tube in question. The air by its gravity descends upon it, and is ready to enter the small hole in the top; but, by a repulsive power from the glass, its action is prevented, so that the mercury cannot fall.

It was, however, some time after the Torricellian experiment had been made, and even after it had been universally agreed that the suspension of the mercury was owing to the weight of the atmosphere, before it was discovered that this pressure of the air was different at different times though the tube was kept in the same place. But the variations of altitude in the mercurial column were too obvious to remain long unobserved; and accordingly philosophers soon became careful

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ful enough to mark them. When this was done, it was impossible to avoid observing also, that the changes in the height of the mercury were accompanied, or very quickly succeeded, by changes in the weather. Hence the instrument obtained the name of the *weather-glass*, and was generally made use of with a view to the foreknowledge of the weather. In this character, its principal phenomena are as follow.

1. The rising of the mercury presages, in general, fair weather; and its falling, foul weather, as rain, snow, high winds, and storms.

2. In very hot weather, the falling of the mercury forebodes thunder.

3. In winter, the rising presages frost; and in frosty weather, if the mercury falls three or four divisions, there will *certainly* follow a thaw. But in a continued frost, if the mercury rises, it will *certainly* snow.

4. When foul weather happens soon after the falling of the mercury, expect but little of it; and, on the contrary, expect but little fair weather when it proves fair shortly after the mercury has risen.

5. In foul weather, when the mercury rises much and high, and so continues for two or three days before the foul weather is quite over, then expect a continuance of fair weather to follow.

6. In fair weather, when the mercury falls much and low, and thus continues for two or three days before the rain comes; then expect a great deal of wet, and probably high winds.

7. The unsettled motion of the mercury denotes uncertain and changeable weather.

8. You are not so strictly to observe the words engraved on the plates, (though in general it will agree with them) as the mercury's *rising* and *falling*. For if it stands at *much rain*, and then rises up to *changeable*, it presages fair weather; though not to continue so long as if the mercury had risen higher: and so, on the contrary, if the mercury stood at *fair*, and falls to *changeable*, it presages foul weather; though not so much of it as if it had sunk lower.

These are the observations of Mr Patrick, on which Mr Rowning makes the following remarks. "From these observations it appears, That it is not so much the height of the mercury in the tube, that indicates the weather, as the motion of it up and down: wherefore, in order to pass a right judgment of what weather is to be expected, we ought to know whether the mercury is actually rising or falling; to which end the following rules are of use.

1. "If the surface of the mercury is convex, standing higher in the middle of the tube than at the sides, it is generally a sign that the mercury is then rising.

2. "If the surface is concave, it is then sinking; and,

3. "If it is plain, the mercury is stationary, or rather if it is a little convex; for mercury being put into a glass tube, especially a small one, will naturally have its surface a little convex, because the particles of mercury attract one another more forcibly than they are attracted by glass. Further,

4. "If the glass is small, shake the tube; and if the air is grown heavier, the mercury will rise about half the tenth of an inch higher than it stood before; if it is grown lighter, it will sink as much. This proceeds from the mercury's sticking to the sides of the

tube, which prevents the free motion of it till it is disengaged by the shock: and therefore, when an observation is to be made with such a tube, it ought always to be shaken first; for sometimes the mercury will not vary of its own accord, till the weather it ought to have indicated is present."

Here we must observe, that the abovementioned phenomena are peculiar to places lying at a considerable distance from the equator; for, in the torrid zone, the mercury in the barometer seldom either rises or falls much. In Jamaica, it is observed by Sir William Beeston*, that the mercury in the morning constantly stood at one degree below *changeable*, and at noon sunk to one degree above *rain*; so that the whole scale of variation there was only $\frac{1}{3}$ of an inch. At St Helena, too, where Dr Halley made his observations, he found the mercury to remain mostly stationary whatever weather happened. Of these phenomena, their causes, and why the barometer indicates an approaching change of weather, the Doctor gives us the following account.

"1. In calm weather, when the air is inclined to rain, the mercury is commonly low.

"2. In serene, good, and settled weather, the mercury is generally high.

"3. Upon very great winds, though they be not accompanied with rain, the mercury sinks lowest of all, with relation to the point of the compass the wind blows upon.

"4. *Ceteris paribus*, the greatest heights of the mercury are found upon easterly, or north-easterly winds.

"5. In calm frosty weather, the mercury generally stands high.

"6. After very great storms of wind, when the mercury has been very low, it generally rises again very fast.

"7. The more northerly places have greater alterations of the barometer than the more southerly.

"8. Within the tropics, and near them, those accounts we have had from others, and my own observations at St Helena, make very little or no variation of the height of the mercury in all weathers.

"Hence I conceive that the principal cause of the rise and fall of the mercury is from the variable winds which are found in the temperate zone, and whose great inconstancy, here in England, is notorious.

"A second cause is, the uncertain exhalation and precipitation of the vapours lodging in the air, whereby it comes to be at one time much more crowded than at another, and consequently heavier; but this latter depends in a great measure upon the former. Now from these principles I shall endeavour to explicate the several phenomena of the barometer, taking them in the same order I have laid them down. Thus,

"1. The mercury's being low inclines it to rain, because the air being light, the vapours are no longer supported thereby, being become specifically heavier than the medium wherein they floated; so that they descend towards the earth, and, in their fall, meeting with other aqueous particles, they incorporate together, and form little drops of rain: but the mercury's being at one time lower than another, is the effect of two contrary winds blowing from the place where the barometer stands; whereby the air of that place is carried both ways from it, and consequently the incumbent

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These phenomena peculiar to the temperate and frigid zones.
* Philist. Transact. no 1200

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Phenomena of the barometer followed by Dr Halley.

Barometer. cylinder of air is diminished, and accordingly the mercury sinks: As, for instance, if in the German ocean it should blow a gale of westerly wind, and, at the same time, an easterly wind in the Irish Sea; or, if in France it should blow a northerly wind, and in Scotland a southerly; it must be granted, that that part of the atmosphere impendant over England would thereby be exhausted and attenuated, and the mercury would subside, and the vapours which before floated in these parts of the air of equal gravity with themselves would sink to the earth.

" 2. The greater height of the barometer is occasioned by two contrary winds blowing towards the place of observation, whereby the air of other places is brought thither and accumulated; so that the incumbent cylinder of air being increased both in height and weight, the mercury pressed thereby must needs stand high, as long as the winds continue so to blow; and then the air being specifically heavier, the vapours are better kept suspended, so that they have no inclination to precipitate and fall down in drops, which is the reason of the serene good weather which attends the greater heights of the mercury.

" 3. The mercury sinks the lowest of all by the very rapid motion of the air in storms of winds. For the tract or region of the earth's surface, wherein the winds rage, not extending all round the globe, that stagnant air which is left behind, as likewise that on the sides, cannot come in so fast as to supply the evacuation made by so swift a current, so that the air must necessarily be attenuated, when and where the said winds continue to blow, and that more or less according to their violence: add to which, that the horizontal motion of the air being so quick as it is, may in all probability take off some part of the perpendicular pressure thereof; and the great agitation of its particles is the reason why the vapours are dissipated, and do not condense into drops so as to form rain, otherwise the natural consequence of the air's rarefaction.

" 4. The mercury stands highest upon the easterly and north-easterly wind; because in the great Atlantic ocean, on this side the 35th degree of north latitude, the winds are almost always westerly or south-westerly; so that whenever here the wind comes up at east and north-east, it is sure to be checked by a contrary gale as soon as it reaches the ocean; wherefore, according to our second remark, the air must needs be heaped over this island, and consequently the mercury must stand high, as often as these winds blow. This holds true in this country; but is not a general rule for others, where the winds are under different circumstances: and I have sometimes seen the mercury here as low as 29 inches upon an easterly wind; but then it blew exceedingly hard, and so comes to be accounted for by what was observed in the third remark.

" 5. In calm frosty weather the mercury generally stands high; because (as I conceive) it seldom freezes but when the winds come out of the northern and north-eastern quarters: or at least, unless those winds blow at no great distance off. For the north parts of Germany, Denmark, Sweden, Norway, and all that tract from whence north-eastern winds come, are subject to almost continual frost all the winter: and thereby the lower air is very much condensed, and in that state is brought hitherward by those winds, and, being accu-

mulated by the opposition of the westerly wind blowing in the ocean, the mercury must needs be pressed to a more than ordinary height; and as a concurring cause, the shrinking of the lower parts of the air into lesser room by cold, must needs cause a descent of the upper parts of the atmosphere, to reduce the cavity made by this contraction to an equilibrium.

" 6. After great storms, when the mercury has been very low, it generally rises again very fast: I once observed it to rise one inch and an half in less than six hours after a long continued storm of south-west wind. The reason is, because the air being very much rarefied by the great evacuations which such continued storms make thereof, the neighbouring air runs in the more swiftly to bring it to an equilibrium; as we see water runs the faster for having a greater declivity.

" 7. The variations are greater in the more northerly places, as at Stockholm greater than at Paris (compared by M Pafchal); because the more northerly parts have usually greater storms of wind than the more southerly, whereby the mercury should sink lower in that extreme; and then the northerly winds bringing in the more dense and ponderous air from the neighbourhood of the pole, and that again being checked by a southerly wind at no great distance, and so heaped, must necessarily make the mercury in such case stand higher in the other extreme.

" 8. Lastly, this remark, that there is little or no variation near the equinoctial, does above all others confirm the hypothesis of the variable winds being the cause of these variations of the height of the mercury; for in the places above named, there is always an easy gale of wind blowing nearly upon the same point, viz. E. N. E. at Barbadoes, and E. S. E. at St Helena, so that there being no contrary currents of air to exhaust or accumulate it, the atmosphere continues much in the same state: however, upon hurricanes, the most violent of storms, the mercury has been observed very low; but this is but once in two or three years, and it soon recovers its settled state, about 29½ inches."

This theory we find controverted by Mr Chambers, in his Dictionary, under the word **BAROMETER**. The principal objections are, That if the wind was the sole agent in raising or depressing the mercury, the alterations of its height in the barometer would be only relative or topical; there would still be the same quantity supported at several places taken collectively: thus what a tube at London lost, another at Paris, Pisa, or Zurich, &c. would gain. But the contrary is found to be the case; for, from all the observations hitherto made, the barometers in several distant parts of the globe rise and fall together. This is a very surprising fact; and deserves to be well examined. Again, setting aside all other objections, it is impossible, on Dr Halley's hypothesis, to explain the mercury's fall before, and rise after, rain. For suppose two contrary winds sweeping the air from over London; we know that few if any of the winds reach above a mile high; all therefore they can do will be to cut off a certain part of the column of air over London: if the consequence of this be the fall of the mercury, yet there is no apparent reason for the rains following it. The vapours indeed may be let lower; but it will only be till they come into an air of the same specific gravity with themselves, and there they will stick as before. Lastly, it

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is impossible, according to the laws of fluids, that the air above any place could be exhausted by the blowing of two contrary winds from it: for, suppose a north-east and south-west wind both blow from London at the same time, there will be two others at the same time blowing towards it from opposite points, viz. a N. W. and S. E. one, which will every moment restore the equilibrium, so that it can never be lost in any considerable degree at least.

Mr Leibnitz accounted for the sinking of the mercury before rain upon another principle, viz. That as a body specifically lighter than a fluid, while it is suspended by it, adds more weight to that fluid, than when, by being reduced in its bulk, it becomes specifically heavier, and descends; so the vapour, after it is reduced into the form of clouds, and descends, adds less weight to the air than before; and therefore the mercury falls. To which it is answered, 1. That when a body descends in a fluid, its motion in a very little time becomes uniform, or nearly so, a farther acceleration of it being prevented by the resistance of the fluid; and then, by the third law of nature, it forces the fluid downwards with a force equal to that whereby it tends to be farther accelerated, that is, with a force equal to its whole weight. 2. The mercury by its descent foretells rain a much longer time before it comes, than the vapour after it is condensed into clouds can be supposed to take up in falling. 3. Supposing that as many vapours as fall in rain during a whole year were at once to be condensed into clouds, and even quite cease to gravitate upon the air, its gravity would scarce be diminished thereby so much as is equivalent to the descent of two inches of mercury in the barometer. Besides, in many places between the tropics, the rains fall at certain seasons in very great quantities, and yet the barometer shews there very little or no alteration in the weight of the atmosphere.

Mr Chambers gives an hypothesis somewhat similar to that of Leibnitz: but as it is liable to the objections just now mentioned, especially the last, we forbear to give any particular account of it; and shall attempt, upon other principles, to give a satisfactory solution of this phenomenon.

The necessary preliminaries to our hypothesis are, 1. That vapour is formed by an intimate union between the element of fire and that of water, by which the fire or heat is so totally enveloped, and its action so entirely suspended by the watery particles, that it not only loses its properties of giving light and burning, but becomes incapable of affecting the most sensible thermometer; in which case, it is said by Dr Black, the author of this theory, to be in a latent state. For the proofs of this, see the articles EVAPORATION, COLD, CONGELATION, &c. 2. If the atmosphere is affected by any unusual degree of heat, it thence becomes incapable of supporting so long a column of mercury as before, for which reason that in the barometer sinks. This appears from the observations of Sir William Beclon already mentioned; and likewise from those of De Luc, which shall be afterwards taken notice of.

These axioms being established, it thence follows, that as vapour is formed by an union of fire with water, or if we please to call it an *electric* attraction between them, or solution of the water in the fire, it is impos-

sible that the vapour can be condensed until this union, attraction, or solution, be at an end. The beginning of the condensation of the vapour then, or the first symptoms of an approaching rain, must be the separation of the fire which lies hid in the vapour. This may be at first slow and partial, or it may be sudden and violent: in the first case, the rain will come on slowly, and after a considerable interval; and in the other, it will be very quick, and in great quantity. But Dr Black hath proved, that when fire quits its latent state, however long it may have lain dormant and insensible, it always assumes its proper qualities again, and affects the thermometer as though it had never been absorbed. The consequence of this must be, that in proportion as the latent heat is discharged from the vapour, it must sensibly affect those parts of the atmosphere into which it is discharged; and in proportion to the heat communicated to these, they will become specifically lighter, and the mercury sink of course. Neither are we to imagine that the quantity of heat discharged by the vapour is inconceivable; for Dr Black hath shewn, that when any quantity of water, a pound for instance, is condensed from the vapour of a common still, as much heat is communicated to the head and refrigeratory as would have been sufficient to heat the pound of water red hot, could it have born that degree of sensible heat.

The causes by which this separation between the fire and water is, or may be, effected, come to be considered under the articles RAIN, CONDENSATION, VAPOUR, &c. Here we have only to observe, that as the separation may be gradual and slow, the barometer may indicate rain for a considerable time before it happens: or if the sensible heat communicated from the vapour to the atmosphere shall be absorbed by the colder parts, or by any unknown means carried off, or prevented from affecting the specific gravity of the air, the barometer will not be affected; and yet the water being deprived of the heat necessary to sustain it, must descend in rain; and thus it is found that the indications of the barometer do not always hold true. Hence also it appears, that tho' the specific gravity of the air is diminished, unless that diminution proceeds from a discharge of the latent heat contained in the vapours, no rain will follow; and thus the sinking of the barometer may prognosticate wind as well as rain, or sometimes nothing at all.

The difficulty, however, on this hypothesis, is to account for the barometer being stationary in all weathers between the tropics; whereas it ought to move up and down there as well as here, only more suddenly, as the changes of weather there are more sudden than here. But it must be considered, that in these climates, during the day-time, the action of the sun's rays is so violent, that what is gained by the discharge of latent heat from the vapour, is lost by the interposition of the clouds betwixt the sun and earth; and in the night, the cold of the atmosphere is so much increased, that it absorbs the heat as fast as the vapour discharges it, so that no sensible effect can be produced; for in warm climates, tho' the day is excessively hot, the night is observed to be vastly colder in proportion than it is with us. This, however, does not prevent the barometer from being affected by other causes, as well as with us; for Dr Halley observes, that in the time of

Barometer. hurricanes it sinks very low.

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Different
kinds of
barometers
described.

Plate LVI.

Having thus given an account of the several phenomena of the barometer considered as a weather-glass, and likewise endeavoured to account for them in the most satisfactory manner, we now proceed to give a particular description of the barometers most commonly made use of, with various schemes for their improvement.

Fig. V. N^o 1. represents the common barometer, such as was invented by Torricelli, and such as we have already given a general description of. AB represents a tube of glass, a quarter of an inch in diameter, and 34 inches long, hermetically sealed at A. This tube being supposed to be filled with mercury, is then inverted into the basin CD; upon which the mercury in the tube falls down to GH, somewhat above 28 inches, while that in the basin rises to CF. The lowest station of the mercury in this country is found to be 28 inches, and the highest 31. From the surface of the mercury CF, therefore, 28 inches are to be measured on the tube AB, which suppose to reach to the point K. This point, therefore, is the lowest of the scale of variation, and in the common barometers is marked *stormy*. In like manner, the highest point of the scale of variation I, is placed 31 inches above EF; and is marked *very dry* on one side for the summer, and *very hard frost* on the other for the winter. The next half inch below is marked *set fair* on the one side, and *set frost* on the other. At 30 inches from CF is marked the word *fair* on one side, and *frost* on the other. Half an inch below that, is wrote the word *changeable*, which answers both for summer and winter. At 29 inches is *rain* on the one side, and *snow* on the other; and at 28½, are the words *much rain* on the one side, and *much snow* on the other. Each of these large divisions is usually subdivided into ten; and there is a small sliding index fitted to the instrument, by which the ascent or descent of the mercury to any number of divisions is pointed out.

This kind of barometer is the most common, and perhaps the most useful of any that hath yet been invented; but as the scale of variation here is only three inches, and it is naturally wished to discover more minute variations than can thus be perceived, several improvements have been thought of.

The improvement most generally adopted is the diagonal barometer represented N^o 2. in which the scale of variation, instead of three inches, may be made as many feet, by bending the tube so as to make the upper part of it the diagonal of a parallelogram of which the shortest side is the three-inches scale of variation of the common barometer. This, however, has a very great inconvenience: for not only is the friction of the mercury upon the glass so much increased that the height doth not vary with every slight change of air; but the column of mercury is apt to break in the tube, and part of it to be left behind, upon any considerable descent.

N^o 3. is the rectangular barometer; where AC represents a pretty wide cylinder of glass, from which proceeds the tube CDF bent into a right angle at D. Suppose now the cylinder AC to be four times larger than the tube CD, so that every inch of the cylinder from C to A should be equal in capacity to four inches of the tube CD. The whole being then filled with mercury, and inverted, the mercury will subside from

A to B, at the same time that it cannot run out at the open orifice F, because the air presses in that way. If any alteration then happens in the weight of the air, suppose such as would be sufficient to raise the mercury an inch from B towards A, it is evident that this could not be done without the mercury in the horizontal leg retiring four inches from E towards D; and thus the scale of variation counted on the horizontal leg would be 12 inches. But the inconveniences of friction are much greater here than in the diagonal barometer; and besides, by the least accident the mercury is apt to be driven out at the open orifice F.

The pendant barometer (N^o 4.) consists of a single tube, suspended by a string fastened to the end A. This tube is of a conical or tapering figure, the end A being somewhat less than the end B. It is hermetically sealed at A, and filled with mercury: then will the mercury sink to its common station, and admit of a length of altitude CD, equal to that in the common barometers. But from the conical bore of the tube the mercury will descend as the air grows lighter, till it reaches its lowest altitude, when the mercury will stand from the lower part of the tube B to E, so that BE will be equal to 28 inches: consequently the mercury will, in such a tube, move from A to E, or 32 inches, if the tube be five feet, or 60 inches; and therefore the scale AE is here above ten times greater than in the common barometer: but the fault of this barometer is, that the tube being of a very small bore, the friction will be considerable, and prevent its moving freely; and if the tube is made of a wider bore, the mercury will be apt to fall out.

N^o 5. is an invention of Mr Rowning, by which the scale of variation may be increased to any length, or even become infinite. ABC is a compound tube hermetically sealed at A, and open at C, empty from A to D, filled with mercury from thence to B, and from thence to E with water. Let GBH be a horizontal line; then it is plain from the nature of the syphon, that all the compound fluid contained in the part from H to G, will be always in *equilibrium* with itself, be the weight of the air what it will, because the pressure at H and G must be equal. Whence it is evident, that the column of mercury DH is in *equilibrium* with the column of water GE, and a column of air taken conjointly, and will therefore vary with the sum of the variations of these. That the variation in this barometer may be infinite, will appear from the following computation. Let the proportion between the bores of the tube AF and FC be such, that when HD, the difference of the legs wherein the mercury is contained, is augmented one inch, GE, the difference of the legs wherein the water is contained, shall be diminished 14: then, as much as the pressure of the mercury is augmented, that of the water will be diminished, and so the pressure of both taken together will remain as it was; and consequently, after it has begun to rise, it will have the same tendency to rise on, without ever coming to an equilibrium with the air.

N^o 6. represents Dr Hook's wheel-barometer. Here ACDG is a glass tube, having a large round head at A, and turned up at the lower end F. Upon the surface of the mercury in the bent leg is an iron ball G, with a string going over a pulley CD. To the other end of the string is fastened a smaller ball H, which as

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meter. the mercury rises in the leg FG, turns the index KL from N towards M, on the graduated circle MNOP; as it rises in the other leg, the index is carried the contrary way by the descent of the heavier ball G, along with the mercury. The friction of this machine, however, unless it is made with very great accuracy, renders it useless.

N^o 7. is another barometer invented by Mr Rowning, in which also the scale may be infinite. ABCD is a cylindrical vessel, filled with a fluid to the height W, in which is immersed the barometer SP consisting of the following parts: The principal one is the glass tube TP, (represented separately at *tp*), whose upper end T is hermetically sealed: this end does not appear to the eye, being received into the lower end of a tin pipe GH, which in its other end G receives a cylindrical rod or tube ST, and thus fixes it to the tube TP. This rod ST may be taken off, in order to put in its stead a larger or a lesser as occasion requires. S is a star at the top of the rod ST: and serves as an index by pointing to the graduated scale LA, which is fixed to the cover of the vessel ABCD. MN is a large cylindrical tube made of tin, (represented separately at *mn*), which receives in its cavity the smaller part of the tube TP, and is well cemented to it at both ends, that none of the fluid may get in. The tube TP, with this apparatus, being filled with mercury, and plunged into the bason MP, which hangs by two or more wires upon the lower end of the tube MN, must be so poised as to float in the liquor contained in the vessel ABCD; and then the whole machine rises when the atmosphere becomes lighter, and *vice versa*. Let it now be supposed, that the fluid made use of is water; that the given variation in the weight of the atmosphere is such, that, by pressing upon the surface of the water at W, the surface of the mercury at X may be raised an inch higher, (measuring from its surface at P), than before; and that the breadth of the cavity of the tube at X, and of the bason at P, are such, that, by this ascent of the mercury, there may be a cubic inch of it in the cavity X more than before, and consequently in the bason a cubic inch less. Now, upon this supposition, there will be a cubic inch of water in the bason more than there was before; because the water will succeed the mercury, to fill up its place. Upon this account the whole machine will be rendered heavier than before by the weight of a cubic inch of water; and therefore will sink, according to the laws of hydrostatics, till a cubic inch of that part of the rod WS, which was above the surface of the water at W, comes under it. Then, if we suppose this rod so small, that a cubic inch of it shall be 14 inches in length, the whole machine will sink 14 inches lower into the fluid than before; and consequently the surface of the mercury in the bason will be pressed, more than it was before, by a column of water 14 inches high. But the pressure of 14 inches of water is equivalent to one of mercury; this additional pressure will make the mercury ascend at X as much as the supposed variation in the weight of the air did at first. This ascent will give room for a second cubic inch of water to enter the bason; the machine will therefore be again rendered so much heavier, and will subside 14 inches farther, and so on *in infinitum*. If the rod was so small that more than fourteen inches of it were required to make a cubic inch, the

variation of this machine would be negative with respect to the common barometer; and instead of coming nearer to an equilibrium with the air by its ascent or descent, it would continually recede farther from it: but if less than 14 inches of rod were required to make a cubic inch, the scale of variation would be finite, and might be made in any proportion to the common one. Neither this nor the other infinite barometer have ever been tried, so that how far they would answer the purposes of a barometer is as yet unknown.

N^o 8. represents another contrivance for enlarging the scale of the barometer to any size.—AB is the tube of a common barometer open at B and sealed at A, suspended at the end of the lever which moves on the fulcrum E. —CD is a fixed glass tube, which serves in place of the cistern. This last tube must be so wide as to allow the tube AB to play up and down within it.—AB being filled with mercury, is nearly counterbalanced by the long end of the lever. When the atmosphere becomes lighter, the mercury descends in the long tube, and the surface of the mercury rising in the cistern pushes up the tube AB, which at the same time becoming lighter, the lever preponderates, and points out the most minute variations. Here too the friction occasions inconveniences; but this may be in some measure remedied by a small shake of the apparatus at each inspection.

In the Philosophical Transactions, Mr Caswell gives the following account of a barometer, which is recommended by Mr Chambers as the most exact hitherto invented. "Let ABCD (N^o 9.) represent a bucket of water, in which is the barometer *erezoim*, which consists of a body *er*; *m*, and a tube *zyo*: the body and tube are both concave cylinders communicating with one another, and made of tin: the bottom of the tube *zy*, has a lead weight to sink it so that the top of the body may just swim even with the surface of the water by the addition of some grain weights on the top. The water, when the instrument is forced with its mouth downwards, gets up into the tube to the height *yu*. There is added on the top a small concave cylinder, which I call the *pipe* to distinguish it from the bottom small cylinder which I call the *tube*. This pipe is to sustain the instrument from sinking to the bottom: *md* is a wire; *ms*, *des*, are two threads oblique to the surface of the water, which threads perform the office of diagonals: for that while the instrument sinks more or less by the attraction of the gravity of the air, there where the surface of the water cuts the thread, is formed a small bubble; which bubble ascends up the thread, as the mercury in the common barometer ascends."

The dimensions of this instrument given there are, 21 inches for the circumference of the body, the altitude 4, each base having a convexity of $6\frac{1}{2}$ inches. The inner circumference of the tube is 5.14 inches, and its length $4\frac{1}{2}$; so that the whole body and tube will contain almost $2\frac{1}{2}$ quarts. The circumference of the pipe, that the machine may not go to the bottom on every small alteration of the gravity of the air, is 2.14 inches; according to which dimensions, he calculates that it will require 44 grains to sink the body to the bottom, allowing it only four inches to descend; at the same time that it is evident, that the fewer grains that are required to sink it to this depth, the more nice the barometer will be. He also calculates, that

Barometer.

when.

Barometer.

when the mercury in the common barometer is 30½ inches high, the body with a weight of 44 grains on its top will be kept in *equilibrium* with the water; but when the mercury stands at 28 inches, only 19 grains can be supported: and lastly, by computing the lengths of the diagonal threads, &c. he finds, that his instrument is 1200 times more exact than the common barometer. The following are his observations on the use of it.

25
Mr Cas-
well's ob-
servations
with his
barometer.

" 1. While the mercury of the common barometer is often known to be stationary 24 hours together, the bubble of the new barometer is rarely found to stand still one minute.

" 2. Suppose the air's gravity increasing, and accordingly the bubble ascending; during the time that it ascends 20 inches, it will have many short descents of the quantity of half an inch, one, two, three, or more inches; each of which being over, it will ascend again. These retrocessions are frequent, and of all varieties in quantity and duration, so that there is no judging of the general course of the bubble by a single inspection, though you see it moving, but by waiting a little time.

" 3. A small blast of wind will make the bubble descend; a blast that cannot be heard in a chamber of the town will sensibly force the bubble downward. The blasts of wind sensible abroad, cause many of the above-mentioned retrocessions, or accelerations in the general course; as I found by carrying my barometer to a place where the wind was perceptible.

" 4. Clouds make the bubble descend. A small cloud approaching the zenith, works more than a great cloud near the horizon. In cloudy weather, the bubble descending, a break of the clouds (or clear place) approaching to the zenith, has made the bubble to ascend; and after that break had passed the zenith a considerable space, the bubble again descended.

" 5. All clouds (except one) hitherto by me observed, have made the bubble to descend. But the other day, the wind being north, and the course of the bubble descending, I saw to the windward a large thick cloud near the horizon, and the bubble still descended: but as the cloud drew near the zenith, it turned the way of the bubble, making it to ascend; and the bubble continued ascending till the cloud was all passed, after which it resumed its former descent. It was a cloud that yielded a cold shower of small hail."

These are the most remarkable contrivances for the improvement of the common barometer: and indeed we must agree with Mr Chambers, that the last, on account of its being so exceedingly sensible, and likewise easy of construction, and portable, seems to deserve attention much more than the others, which are always the more unexact, and the less easily moved, according to the enlargement of their scale; whereas this is seemingly subject to no such inconvenience. It is evident, however, that none of these could be used at sea, on account of the unsteady motion of the ship: for which reason Dr Hook thought of constructing a barometer upon other principles.

His contrivance was no other than two thermometers. The one was the common spirit-of-wine thermometer, which is affected only by the warmth of the air: the other, which acts by the expansion of a bubble of air included, is affected not only by the external

warmth, but by the various weight of the atmosphere. Therefore, keeping the spirit thermometer as a standard, the excess of the ascent or descent of the other above it would point out the increase or decrease of the specific gravity of the atmosphere. This instrument is recommended by Dr Halley, who speaks of it as follows.

" It has been observed by some, that, in long keeping this instrument, the air included either finds a means to escape, or deposits some vapours mixed with it, or else for some other cause becomes less elastic, whereby in process of time it gives the height of the mercury somewhat greater than it ought; but this, if it should happen in some of them, hinders not the usefulness thereof, for that it may at any time very easily be corrected by experiment, and the rising and falling thereof are the things chiefly remarkable in it, the just height being barely a curiosity.

" I had one of these barometers with me in my late southern voyage, and it never failed to prognosticate and give early notice of all the bad weather we had, so that I depended thereon, and made provision accordingly; and from my own experience I conclude, that a more useful contrivance hath not for this long time been offered for the benefit of navigation."

A new kind of marine barometer hath lately been invented by Mr Nairne. It differs from the common one in having the bore of the tube small for about two feet in its lower part; but above that height it is enlarged to the common size. Through the small part of the instrument, the mercury is prevented from ascending too hastily by the motion of the ship; and the motion of the mercury in the upper wide part is consequently lessened. Much is found to depend on the proper suspension of this instrument; and Mr Nairne has since found, by experiment, the point from which it may be suspended so as not to be affected by the motion of the ship.

We must now speak of the barometer in its second character, namely, as an instrument for measuring accessible altitudes. This method was first proposed by M. Pascal; and succeeding philosophers have been at no small pains to ascertain the proportion between the sinking of the mercury, and the height to which it is carried. For this purpose, however, a new improvement in the barometer became necessary, viz. the making of it easily portable from one place to another, without danger of its being broken by the motion of the mercury in the tube. The common portable barometer is constructed as follows.

The tube containing the mercury, instead of having its lower end immersed in a vessel of that fluid, has it tied up in a leathern bag not quite full of mercury: and though the external air cannot get into the bag to suspend the mercury in the tube by pressing on its surface as in the common one; yet it has the same effect, by pressing on the outside of the bag; which being pliant, yields to the pressure, and keeps the mercury suspended in the tube at its proper height. This bag is generally inclosed in a little box, through the bottom of which passes a screw: with this screw the bag may be compressed so as to force the mercury up to the top of the tube; which keeps it steady, and hinders it from breaking the tube by dashing against the top when it is carried about, which it is otherwise apt to do.

Among the number of portable barometers we may

Baromet.

27
Recom-
mended
Dr Halley

28
Marine
rometer
Mr Nair

29
Baromet
applied to
the mens-
uration of
altitudes.

30
Portable
baromet

31
Statistical
perhaps
rometer.

26
Marine
barometer by
Mr Hook.

perhaps reckon what Mr Boyle called his *Statical* barometer. It consisted of a glass bubble, about the size of a large orange, and blown very thin, so as to weigh only 70 grains. This being counterpoised by brass weights in a pair of scales that would turn with the thirtieth part of a grain, was found to act as a barometer. The reason of this was, that the surface of the bubble was opposed to a vastly larger portion of air than that of the brass weight; and consequently behaved to be affected by the various specific gravity of the atmosphere: thus when the air became specifically light, the bubble descended, and *vice versa*; and thus, he says, he could have perceived variations of the atmosphere no greater than would have been sufficient to raise or lower the mercury in the common barometer an eighth part of an inch.

The portable barometer, as already observed, has long been in use for the mensuration of accessible altitudes; and, in small heights, was found to be more exact than a trigonometrical calculation, the mercury descending at the rate of about one inch for 800 feet of height to which it was carried: but, in great heights, the most unaccountable differences were found between the calculations of the most accurate observers; so that the same mountain would sometimes have been made thousands of feet higher by one person than another; nay, by the same person at different times. All these anomalies M. de Luc of Geneva undertook to account for, and to remove; and in this undertaking he persisted with incredible patience for 20 years. The result of his labour is as follows.

The first cause of irregularity observed was a fault in the barometer itself. M. de Luc found, that two barometers, though perfectly alike in their appearance, did not correspond in their action. This was owing to air contained in the tube. The air was expelled by boiling the mercury in them; after which, the motions of both became perfectly consonant. That the tubes may bear boiling, they must not be very thick, the thickness of the glass not above half a line, and the diameter of the bore ought to be from two and an half to three lines. The operation is performed in the following manner; A chafing dish with burning coals is placed on a table; the tube, hermetically sealed at one end, is inverted and filled with mercury within two inches of the top; the tube is gradually brought near the fire, moving it obliquely up and down, that the whole length of it may be heated; and advancing it nearer and nearer, till it is actually in the flame, the globules of air begin to move visibly towards the top. The boiling at last commences; and it is easy to make it take place from one end to the other, by causing the several parts of the tube successively pass with rapidity through the flame.

The next cause of variation, was a difference of temperature. To discover the effects of heat on the mercury, several barometers were chosen that for a long time had been perfectly consonant in their motions. One of these was placed in an apartment by itself, to mark the change in the external air, if any should happen. The rest were situated in another apartment, along with three thermometers, graduated according to the scale of M. De Reaumur, and exactly correspondent with one another. The point at which the mercury stood when the experiment began, was care-

fully noted, and also the precise height of the thermometers. The latter apartment then was gradually heated; and with so much uniformity, that the thermometers continued still to agree. When the heat had been augmented as much as possible, the altitudes both of the barometers and thermometers were again accurately marked, to ascertain the differences that corresponded to one another. This experiment was repeated several times with next to no variation; and from the barometer in the first apartment it appeared, that no sensible alteration had taken place in the external air. Hence M. De Luc found, that an increase of heat sufficient to raise the thermometer from the point of melting ice to that of boiling water, augments the height of the mercury in the barometer precisely six lines; and therefore, dividing the distance between these two points on the thermometer into 96 equal parts, there will be $\frac{1}{16}$ th of a line to add to, or subtract from, the height of the mercury in the barometer, for every degree of variation of the thermometer so graduated. A scale of this kind, continued above boiling or below freezing water, accompanies his portable barometer and thermometer.—So accurate, he says, did long practice make him in barometrical observations, that he could distinguish a variation of $\frac{1}{12}$ of a line in the height of the mercury. He allows of no inclination of the tube, or other means to augment the scale, as all these methods diminish the accuracy of the instrument. Two observations are always required to measure the altitude of a mountain: one with a barometer left on the plain, and another on the summit; and both must be accompanied with a thermometer.

His portable barometer consists of two tubes, one of 34 French inches in length; and from the top, for this length, perfectly straight; but, below this, it is bent round, so that the lower end turns up for a short space, parallel to the straight part. On this open end is fixed a cock; and on the upper side of this cock, is placed another tube, of the same diameter with the former, eight inches in length, open at both ends, and communicating with the long tube, through the cock. When the barometer is carried from one place to another, it is inverted very slowly, to hinder any air getting in; the quicksilver retires into the long tube on which the key of the cock is turned; and to preserve the cock from too great pressure of the mercury, the barometer is conveyed about in this inverted posture. When an observation is to be made, the cock is first opened; the tube is then turned upright, very slowly, to prevent, as much as possible, all vibration of the mercury, which disturbs the observation; and, according to the weight of the atmosphere, the mercury falls in the longer branch, and rises up through the cock, into the shorter.

The whole of the cock is made of ivory, except the key. The extremities of the tubes are wrapped round with the membrane employed by the gold-beaters, done over with fish-glue, in order to fix them tight, the one in the lower, and the other in the upper, end of the perpendicular canal of the cock. The part of the key that moves within the cock is of cork, and the outward part or the handle is of ivory. The cork is fastened firmly to the ivory by means of a broad thin plate of steel, which cuts both the ivory and cork, length-wise, through the centre, and reaches inward

Barometer. to the hole of the key. This plate also counteracts the flexibility of the cork, and makes it obey the motion of the handle, notwithstanding it is very considerably compressed by the ivory, to render it tight. That this compression may not abridge the diameter of the hole of the key, it is lined with a thin hollow ivory cylinder, of the same diameter with the tubes.

On the upper end of the shorter tube is fixed, in the intervals of observation, a kind of funnel, with a small hole in it, which is shut with an ivory stopple. The use of it is to keep the tube clean, to replace the mercury that may have made its way thro' the cock in consequence of any dilatation, and likewise to replace the mercury taken out of the shorter tube, after shutting the cock, on finishing an observation; because, when the mercury is left exposed to the air, it contracts a dark pellicle on its surface, that sullies both itself and the tube. The shorter tube should be wiped from time to time, by a little brush of sponge fixed on the end of a wire.

The barometer, thus constructed, is placed in a long box of fir, the two ends of which are lined on the inside with cushions of cotton, covered with leather. This box may be carried on a man's back, like a quiver, either walking or riding; and should have a cover of wax-cloth, to defend it against rain. It should be kept at some distance from the body of the man, and be protected from the sun by an umbrella, when near the place of observation, to prevent its being affected by any undue degree of heat. The barometer should, farther, be attended with a plummet, to determine the perpendicular position of it; and a tripod, to support it firm in that position at the time of observation.

The scale of the barometer begins on the long tube, at a point on a level with the upper end of the short one; and rises, in the natural order of the numbers, to 21 inches. Below the above point, the scale is transferred to the short tube; and descends on it, in the natural order of the numbers, to 7 inches. The whole length of the scale is 28 French inches; and since, as the mercury falls in the one tube, it must rise in the other; the total altitude will always be found by adding that part of the scale, which the mercury occupies in the long tube, to that part of it which the mercury does not occupy in the short one. In estimating, however, the total fall or rise on the long tube, every space must be reckoned twice; because, of barometers of this construction, half the real variation only appears in one of the branches.

Near the middle of the greater tube, is placed the thermometer abovementioned, for ascertaining the corrections to be made on the altitude of the mercury, in consequence of any change in the temperature of the air. It is placed about the middle of the barometer, that it may partake as much as possible of its mean heat. The ball is nearly of the same diameter with the tube of the barometer, that the dilatations or condensations of the fluids they contain may more exactly correspond. The scale is divided into 96 parts; between the points of boiling water and melting ice, and the term of 0, is placed one eighth part of this interval above the lower point; so that there are 12 degrees below, and 84 above, it. The reason for placing 0 here is, that, as 27 French inches are about the mean height of the barometer, so the 12th degree above freezing is nearly the mean altitude of the thermometer. Hence,

by taking these two points, the one for the mean altitude, and the other for the mean heat, there will be fewer corrections necessary to reduce all observations to the same state, than if any higher or lower points had been fixed upon.

If then the barometer remain at 27 inches, and the thermometer at 0, there are no corrections whatever to be made. But if, while the barometer continues at 27 inches, the thermometer shall rise any number of degrees above 0, so many sixteenths of a line must be subtracted from the 27 inches, to obtain the true height of the barometer, produced by the weight of the atmosphere, and to reduce this observation to the state of the common temperature. If, on the other hand, the thermometer shall fall any number of degrees below 0, while the barometer still stands at 27 inches, so many sixteenths must be added to that height, to obtain the true altitude.

Nothing is more simple than these corrections, when the barometer is at or near 27 inches of height. If, however, it fall several inches below this point, as the portable barometer very frequently must, the dilatations will no longer keep pace with the degrees of heat, after the rate of $\frac{1}{16}$ of a line for every degree of the thermometer; because, the columns of mercury being shortened, the quantity of fluid to be dilated will be diminished. The truth is, the quantity of the dilatations for the same degree of heat is just as much diminished as the column is shortened. If, then, it shall still be found convenient to reckon the dilatations by sixteenths of a line, these sixteenths must be counted on a scale, of which the degrees shall be as much longer than the degrees of the first scale, as the shortened column of mercury is less than 27 inches, the height to which the length of the degrees of the first scale was adapted. For instance, let the mercury descend to 13 $\frac{1}{2}$ inches, half the mean column, and let the thermometer ascend 10 degrees above the mean heat; 10 sixteenths should be deducted from the mean column, for this temperature, according to the rule; but 10 half-sixteenths only, or 5 whole sixteenths, must be subtracted from the column of 13 $\frac{1}{2}$ inches, because the sum of its dilatations will be half that of the former, the quantities of fluid being to one another in that proportion.

It would cause considerable embarrassment if the sixteenths of correction were always to be subdivided into less fractions, proportional to every half inch of descent of the barometer; and the same end is obtained in a very easy manner, by reckoning the corrections on different scales of the same length, but of which the degrees are longer according as the columns of the barometer are shorter. For example, the degrees of correction on the scale applicable to the column of 13 $\frac{1}{2}$ inches, will be double in length what the same degrees are for the column of 27 inches; and, of course, the number of corrections will be reduced likewise one half, which we have seen by the rule they ought to be.

The author constructed, on a piece of vellum, scales with these properties, for no less than 23 columns of mercury, being all those between 18 inches and 29 inclusive, counting from half inch to half inch; within which extremes, every practical case will be comprehended. He wrapped this vellum on a small hollow cylinder, including a spring, like a spring-curtain, and
fixed

ometer. fixed it on the right side of the thermometer. The vellum is made to pass from right to left, behind the tube of the thermometer, and to graze along its surface. The observer, to find the corrections to be made, pulls out the vellum till the scale corresponding to the observed altitude of the barometer comes to touch the thermometer, and on that scale he counts them. The vellum is then let go, and the screw gently furls it up.

The author having now, as he imagined, completely finished the instruments necessary for the accurate mensuration of heights; proceeded to establish, by experiment, the altitudes corresponding to the different descents of the mercury. Much had been written, and many rules had been given, on this subject, by different eminent philosophers, since the days of Pascal, who first broached it: but these disagreed so much with one another, and presented so little good reason why any one of them should be preferred, that no conclusion could, with confidence, be deduced from them. It became requisite, therefore, to lay them all aside, and to endeavour to discover, by practice, what could not be ascertained by theory. Salève, a mountain near Geneva, was chosen for the scene of these operations. This mountain is near 3000 French feet high. The height of it was twice measured by levelling, and the results of the mensurations differed only 10½ inches; tho' there intervened six months between them, and the total altitude was so considerable. On this mountain were chosen no less than 15 different stations, rising after the rate of 200 feet, one above another, as nearly as the ground would admit. At these stations, it was proposed to make such a number of observations as might be a good foundation, either for establishing a new rule of proportion between the heights of places and the descents of the mercury, or for preferring some one of those formerly discovered.

Little progress was made in this plan, when a phenomenon, altogether unexpected, presented itself. The barometer being observed, at one of the stations, twice in one day, was found to stand higher in the latter observation than in the former. This alteration gave little surprise, because it was naturally imputed to a change of the weight of the atmosphere, which would affect the barometer on the plain in the same manner. But it produced a degree of astonishment, when, on examining the state of the latter, it was found, instead of corresponding with the motions of the former, to have held an opposite course, and to have fallen while the other rose. This difference could not proceed from any inaccuracy in the observations, which had been taken with all imaginable care; and it was so considerable as to destroy all hopes of success, should the cause not be detected and compensated.

The experiment was repeated several times, at intervals, that no material circumstance might escape notice. An observer on the mountain, and another on the plain, took their respective stations at the rising of the sun, and continued to mark an observation, every quarter of an hour, till it set. It was found, that the lower barometer gradually descended for the first three quarters of the day, after which it re-ascended, till, in the evening, it stood at nearly the same height as in the morning; that the higher barometer ascended for the first three fourths of the day, and then descended, so as to regain likewise, about sunset, the altitude of the

morning.

The following theory seems to account in a satisfactory manner for this phenomenon. When the sun rises above the horizon of any place, his beams penetrate the whole of the section of the atmosphere of which that horizon is the base. They fall, however, very obliquely on the greater part of it, communicate little heat to it, and consequently produce little dilatation of its air. As the sun advances, the rays become more direct, and the heat and rarefaction of course increase. But the greatest heat of the day is not felt even when the rays are most direct, and the sun is in the meridian. It increases while the place receives more rays than it loses, which it will do for a considerable time after mid-day; in like manner, as the tide attains not its highest altitude till the moon has advanced a considerable way to the west of the meridian. The heat of the atmosphere is greatest at the surface of the earth, and seems not to ascend to any great distance above it. The dilatations, for this reason, of the air, produced by the sun, will be found chiefly, if not solely, near the earth. A motion must take place, in all directions, of the adjacent air, to allow the heated air to expand itself. The heated columns extending themselves vertically, will become longer, and at the same time specifically lighter, in consequence of the rarefaction of their inferior parts. The motion of air, till it rises into wind, is not rapid; these lengthened columns, therefore, will take some time to dissipate their summits among the adjacent less rarefied columns that are not so high; at least, they will not do this as fast as their length is increased by the rarefaction of their bases.

The reader, we presume, anticipates the application of this theory to the solution of the phenomenon in question. The barometer on the plain begins to fall a little after morning, because the column of air that supports it becomes specifically lighter on account of the rarefaction arising from the heat of the sun. It continues to fall for the first three quarters of the day; because, during that time, the heat, and consequently the rarefaction, are gradually increasing. It rises again, after this period; because the cold, and of course the condensation, coming on, the specific gravity is augmented by the rushing in of the adjacent air. The equilibrium is restored, and the mercury returns to the altitude of the morning.

The barometer on the eminence rises after morning, and continues to do so for three fourths of the day, for two reasons. The density of the columns of air is greatest near the earth, and decreases as the distance from it increases. The higher, for this reason, we ascend in the atmosphere, we meet with air specifically lighter. But by the rarefaction of the base of the column that supports the mercury of the barometer on the eminence, the denser parts of that column are raised higher than naturally they would be if left to the operation of their own gravity. On this account, the higher barometer is pressed with a weight, nearly as great as it would sustain, were it brought down, in the atmosphere, to the natural place of that denser air now raised above it by the prolongation of the base of the column. The other reason is, that as the rarefaction does not take place at any great distance from the earth, little change is produced in the specific gravity

Barometer.

of the portion of the column that presses on the higher barometer, and the summit of that column dissipates itself more slowly than it increases. Thus, we see how this barometer must ascend during the first three fourths of the day, and pursue a course the reverse of that on the plain. The condensations returning after this time, the denser air subsides, the equilibrium takes place, and the mercury descends to its first position.

40
Render another pair of thermometers necessary.

This phenomenon prompted the idea of a second pair of thermometers, to measure the mean heat of the column of air intercepted between the barometers. These thermometers are extremely delicate and sensible. The tubes are the finest capillary, the glass very thin, and the diameters of the balls only three lines. The balls are insulated, or detached from the scales, which are fixed to the tubes only, by ligatures of fine brass-wire covered with silk. The air, by this contrivance, has free communication with the balls on all sides; and, if the direct rays of the sun be intercepted at some distance by a bit of paper, or even the leaf of a tree, the thermometers will quickly mark the true temperature of the air.

41
Method of computing the altitudes.

The reader, perhaps, will ask here, Could not this end have been gained by the first pair of thermometers? But we must request him to suspend his judgment, till we have explained the theory of computing the altitudes from the descents of the mercury. He will then find the scales of these thermometers so different, that neither of them could, without much inconvenience, serve the purpose of the other.

The altitudes are computed by logarithms. A table of logarithms contains two series of numbers, running parallel to one another. The first has its terms in geometrical progression, and the second its terms in arithmetical. The natural numbers 1, 2, 3, 4, &c. form the first series; which, though in arithmetical progression when standing detached, are in geometrical in regard of the second series; whose terms are in arithmetical progression, and are called *logarithms*, because they express the distance of their correspondent terms of the geometrical progression from the beginning of the series.

To apply this table to the present purpose: let us suppose the whole atmosphere divided into concentric spherical sections, whose common centre is that of the earth. Suppose, also, all these sections of equal thickness, namely, 12.497 toises, which is found to be the thickness of the lowest section, and balances a line of mercury, when the barometer stands at 348 lines or 29 inches. Add, then, all these sections together; and we shall have the total altitude of the atmosphere expressed in an arithmetical progression, whose common difference is 12.497 toises. Consequently, in this view, the heights are proportional to the logarithms.

It remains only to find the descents of the mercury, which measures the weights of the respective sections, in geometrical proportion, in order to justify the application of the logarithmic table to the computation of the altitudes. Now, it is easy to prove, in a very satisfactory manner, that the mean densities of these sections, which are in proportion of their weights, must be in geometrical progression, when the altitudes are in arithmetical; consequently, it is with great propriety and convenience that the logarithms are employed in

Baromet.

the computation of the altitudes corresponding to the descents of the mercury. For, to find the vertical distance between two barometers, at different heights, no more is necessary than to look, in a table of logarithms, for the numbers that express in lines, or sixteenths of a line, the altitudes of the two columns of mercury, and take the logarithms of these numbers, whose difference will give this distance accurately, in thousandth parts of a toise. Multiply the toises by 6, which will furnish the altitudes in French feet.

The author made about 500 different observations at the several stations on the mountain of Saleve, which both suggested and verified the computation by logarithms. Many, however, of these observations, produced conclusions that deviated considerably from the results of the actual mensuration, on account of the different temperatures in which they were taken. It was the design of the second pair of thermometers to point out the corrections of these deviations. In settling the scales necessary for this end, the first object was, to mark the temperature of all the observations where the logarithms gave the altitudes exactly, or nearly equal to what they were found to be by levelling. This temperature corresponded to $16\frac{1}{2}$ on the scale of Reaumur, and to 70 on that of Fahrenheit, and at it was fixed the term 0. The next step was, to determine the corrections of the heights that became necessary, according as the state of the air was warmer or colder than the fixed point. With this view, all the remaining observations were collected, and compared with the different temperatures in which they were taken; and from an attentive examination of these circumstances, it was discovered, that for every 215 feet of height furnished by the logarithms, one foot of correction must be added or subtracted, for every degree of the thermometer, according as it stood above or below the term 0.

The scale of Reaumur did not conveniently express this correction of 1 to 215. The author wished to adopt the ratio of 1 to 1000, in forming a new scale for that purpose; but the divisions would have been too small. He employed, therefore, that of 1 to 500; because, by doubling the degrees of the higher thermometer above or below 0; or, which amounted nearly to the same thing, by doubling the mean heat of the column of air in taking the sum of the degrees of both thermometers, there resulted the ratio of 1 to 1000. The new scale, then, was divided by the following proportion: As 215, the last term of the ratio found by Reaumur's scale, is to 500, the last term of the ratio to be applied on the new scale; so is 80, the parts between the fixed points of the first scale, to 186, the number of parts between the same points on the second. And as 80 is to 186, so is $16\frac{1}{2}$, the point on Reaumur's scale at which the logarithms give the altitudes without correction, to 39, the point at which they give them on the new scale. The term 0 is placed at this point, 39 at melting ice, and 147 at that of boiling water. To reduce all observations to the same temperature by this scale, nothing more is necessary than to multiply the heights found from the logarithms, by the sum of the degrees of both thermometers above or below 0, and to divide the product by 1000. The quotient must be added to, or subtracted from, the logarithmic height, according as the temperature is positive or negative.

rometer,
baron.

As a specimen of the author's method, we shall now present our readers with the result of his operations at the 15 stations on Saleve. In one column are marked the heights found by levelling, and opposite to them the same heights found by the barometer; to the latter are prefixed the number of observations of which they are the mean.

Stations.	Heights by levelling.		Number of observations.	Heights by barometer.
	feet.	inches.		feet.
1	216	2	12	230 $\frac{1}{2}$
2	428	10	13	435 $\frac{1}{2}$
3	586	0	13	591 $\frac{1}{2}$
4	728	8	21	732 $\frac{1}{2}$
5	917	0	24	919 $\frac{1}{2}$
6	1218	8	27	1221 $\frac{1}{2}$
7	1420	0	23	1418 $\frac{1}{2}$
8	1800	0	17	1798 $\frac{1}{2}$
9	1965	3	17	1962 $\frac{1}{2}$
10	2211	0	17	2210
11	2333	0	17	2331 $\frac{1}{2}$
12	2582	4	16	2583 $\frac{1}{2}$
13	2700	0	15	2703 $\frac{1}{2}$
14	2742	0	10	2741 $\frac{1}{2}$
15	2926	0	11	2924 $\frac{1}{2}$

From this table, we presume the reader will be inclined to entertain the most favourable opinion of the abilities and industry of the author; but his barometer is probably susceptible of improvement. It seems too bulky and complex, and liable to accidents, and will require long practice to render other observers equally accurate and dextrous with him in its use. We hear, however, that the ingenious Mr Ramfden of London, optician, has actually invented and constructed a portable barometer, as simple and light, almost, as the common stationary one. It is little apt to be disarranged by motion; and is capable, by the help of a Nonius index, to mark distinctly a variation of the mercury to the thousandth part of an inch, which corresponds, on the surface of the earth, to nearly 6 inches of height.

BARON, a degree next below a viscount, and the lowest of nobility. See **NOBILITY**.

A baron's is the most general and universal title of nobility; for originally every one of the peers of superior rank had also a barony annexed to his other titles. But it hath sometimes happened, that, when an ancient baron hath been raised to a new degree of peerage, in the course of a few generations the two titles have descended differently; one perhaps to the male descendants, the other to the heirs general; whereby the earldom or other superior title hath subsisted without a barony; and there are also modern instances, where earls and viscounts have been created without annexing a barony to their other honours: so that now the rule doth not hold universally, that all peers are barons. The original and antiquity of baronies has occasioned great inquiries among our English antiquarians. The most probable opinion seems to be, that they were the same with our present lords of manors; to which the name of *court baron* (which is the lord's court, and incident to every manor) gives some countenance. It may be collected from king John's *magna charta*, that originally all lords of manors, or barons, that held of the king *in capite*, had seats in the great council or

parliament: till about the reign of that prince the confux of them became so large and troublesome, that the king was obliged to divide them, and summon only the greater barons in person; leaving the small ones to be summoned by the sheriff, and (as it is said) to sit by representation in another house; which gave rise to the separation of the two houses of parliament. By degrees the title came to be confined to the greater barons, or lords of parliament only; and there were no other barons among the peerage but such as were summoned by writ, in respect of the tenure of their lands or baronies, till Richard II. first made it a mere title of honour, by conferring it on divers persons by his letters patent. See **LAW**, Part III. N^o clviii. 12, 13, 14.

BARON by Tenure, one who held certain territories of the king, who still retained the tenure in chief to himself.

BARONS of the Exchequer, the four judges to whom the administration of justice is committed, in causes between the king and his subjects, relating to matters concerning the revenue. They were formerly barons of the realm, but of late are generally persons learned in the laws. Their office is also to look into the accounts of the king, for which reason they have auditors under them. See **AUDITOR**.

BARONS of the Cinque-ports are members of the house of commons, elected by the five ports, two for each port. See the article **CINQUE-PORTS**.

BARON and Feme, in the English law, a term used for husband and wife, in relation to each other: and they are deemed but one person; so that a wife cannot be witness for or against her husband, nor he for or against his wife, except in cases of high treason.

BARON and Feme, in heraldry, is when the coats of arms of a man and his wife are borne *par pale* in the same escutcheon, the man's being always on the dexter side, and the woman's on the sinister; but here the woman is supposed not an heiress, for then her coat must be borne by the husband on an escutcheon of pretence *.

BARON (Robert), a dramatic author, who lived during the reign of Charles I. and the Protectorship of Oliver Cromwell. He received the earlier parts of his education at Cambridge, after which he became a member of the honourable society of Gray's-Inn. During his residence at the university, he wrote a novel called the *Cyprian Academy*, in which he introduced the two first of the dramatic pieces mentioned below. The third of them is a much more regular and perfect play, and was probably written when the author had attained a riper age. The names of them are, 1. *Deorum Dona*, a masque. 2. *Gripus and Hegio*, a pastoral. 3. *Mirza*, a tragedy. Mr Baron had a great intimacy with the celebrated Mr James Howell, the great traveller, in whose collections of Letters * there is one to this gentleman, who was at that time at Paris. To Mr Howel in particular, and to all the ladies and gentlemen in England in general, he has dedicated his romance.

BARON (Michael), an excellent comedian of Paris, was the son of Michael Baron another comedian who was a native of Iffoudun. He wrote some poems, and several theatrical pieces, which are printed together in 2 vols 12mo. He died at Paris in 1729, aged 77.

BARONET. This is a modern degree of honour, instituted by king James I. on the 22^d of May, 1611,

Baron,
Peers.

* See *Pale*,
and *Escutcheon of Pretence*.

* Vol. III.
Let. 418.

Baronet,
Baroni.

and the 9th year of his reign; who made it hereditary in the male line, as an encouragement to those of his subjects who assisted in the reduction of the province of Ulster in Ireland. The number of baronets was first restricted to 200; but it is now enlarged at the king's pleasure, without limitation. The title of *baronet* is conferred by patent under the great seal; and, like other knights, he is distinguished by the appellation *Sir*, prefixed to his Christian name, in speaking and writing.

No person could be admitted into this order, unless he was a gentleman of unblemished morals, and possessed of an yearly income of 1000*l.* in land; and the express condition of his admission was, that he should pay 1095*l.* for the maintenance of 30 soldiers, for three years on the military establishment of Ireland. As an armorial badge of distinction, a baronet wears, in a canton or escutcheon, the arms of Ulster, viz. *Argent, a sniſter Hand couped at the wrist, Gules.*

BARONET of Scotland. The order of baronets in Scotland was also projected by king James I. for the plantation and cultivation of the province of Nova Scotia, in America; and his son king Charles I. executed his royal father's plan by instituting this order soon after his accession to the throne: the first person dignified with this title was Sir Robert Gordon, of Gordonstone, a younger son of the earl of Sutherland, whose patent bears date the 28th of May 1625. — His majesty king Charles I. was so desirous of adding every mark of dignity to this his favourite order, that, four years after its institution, he issued a royal warrant, granting them the privilege of wearing an orange ribbon and a medal; which last was presented to each of them by the king himself, according to the words of the warrant. All the privileges of the order, particularly this of wearing the medal, were confirmed at the king's request by the Convention of Estates, in the year 1630; and in order to establish them on the most solid foundation, they were again confirmed by an act of the parliament of Scotland, in the year 1633. This mark of distinction fell to the ground with all the other honours of this country, during the usurpation of the long parliament and of Oliver Cromwell. It continued in general, though not total, disuse, after the Restoration. There have been former meetings of the order to revive the use of it, one in the year 1721, and another in 1734. These meetings proved ineffectual, because the proper steps towards its revival were not taken; but, under the auspices of our illustrious monarch George III. such measures were concerted in the year 1775, as have effectually established this honourable dignity.

BARONET of Ireland. This order was likewise instituted by king James I. in the 18th year of his reign, for the same purpose and with the same privileges within the kingdom of Ireland, as he had conferred on the like order in England; for which the Irish baronets paid the same fees into the treasury of Ireland. The first of that kingdom that was advanced to this hereditary dignity was Sir Francis Blundell, then secretary for the affairs of Ireland. Since his time, several have been created, no number being limited.

BARONI (Leonora), a celebrated singer and composer, was born at Naples, but spent the greatest part of her life at Rome. She was daughter of Adriana Baroni of Mantua, baroness of Pian-caretta; a lady also

Baroni
Baronius.

distinguished for her musical talents, and for her beauty firnamed the *fair*. Leonora had less beauty than her mother; but excelled her in her profound skill in music, the fineness of her voice, and the charmingness of her manner. She is said by Mr Bayle to have been one of the finest singers in the world. She was, as well as her mother, celebrated by the wits, who strove to excel each other in recording her praises; and in 1639 there was published, at Bracciano, a collection of Latin, Greek, Italian, Spanish, and French poems made upon her, under this title, *Applausi Poetici alle Glorie della Signora Leonora Baroni*. Among the Latin poems of Milton are no fewer than three entitled 'Ad Leonoram Romæ canentem,' wherein this lady is celebrated for her singing, with an allusion to her mother's exquisite performance on the lute. A fine eulogium on this accomplished woman is contained in a discourse on the Music of the Italians, printed with the life of Malherbe, and some other treatises at Paris, 1672, in 12mo. This discourse was composed by Mr Maugars, prior of St Peter de Mac, the king's interpreter of the English language, and besides so famous a performer on the viol, that the king of Spain and several other sovereign princes of Europe desired to hear him. The character given by this person of Leonora Baroni is as follows: "She is endowed with fine parts; she has a very good judgment to distinguish good from bad music; she understands it perfectly well; and even composes, which makes her absolute mistress of what she sings, and gives her the most exact pronunciation and expression of the sense of her words. She does not pretend to beauty, neither is she disagreeable, or a coquet. She sings with a bold and generous modesty, and an agreeable gravity; her voice reaches a large compass of notes, and is exact, loud, and harmonious; she softens and raises it without straining or making grimaces. Her raptures and sighs are not lascivious; her looks have nothing impudent, nor does she transgress a virgin modesty in her gestures. In passing from one key to another, she shews sometimes the divisions of the enharmonic and chromatic kind with so much art and sweetness, that every body is ravished with that fine and difficult method of singing. She has no need of any person to assist her with a theorbo or viol, one of which is necessary to make her singing complete; for she plays perfectly well herself on both these instruments. In short, I have had the good fortune to hear her sing several times above 30 different airs, with second and third stanzas composed by herself. I must not forget to tell you, that one day she did me the particular favour to sing with her mother and her sister. Her mother played upon the lute, her sister upon the harp, and herself upon the theorbo. This concert, composed of three fine voices, and of three different instruments, so powerfully transported my senses, and threw me into such raptures, that I forgot my mortality, and thought myself already among the angels enjoying the felicity of the blessed."

BARONIUS (Cæsar), a pious and learned cardinal, was born at Sore in 1538. He studied at Rome, and put himself under the discipline of St Philip de Neri. In 1593, he was made general of the congregation of the Oratory by the resignation of the founder Philip de Neri. Pope Clement VIII. made him his confessor, and created him a cardinal in 1596. He was afterwards

longy
Barratier

wards made librarian to the Vatican; and died in 1605, at 68 years of age. He wrote several works, the principal of which is his *Annales Ecclesiastici*, from A. D. 1 to 1198, in 12 vols folio; which has been abridged by several persons, particularly by Henry Spondæus, Bzovius, and Ludovico Aurelio.

BARONY, the honour and territory which gives title to a baron, whether he be a layman or a bishop.

BARRA, in commerce, a long-measure used in Portugal and some parts of Spain, to measure woollen cloths, linen cloths, and ferges. There are three sorts; the barra of Valencia, 13 of which make 12½ yards English measure; the barra of Castile, 7 of which make 6½ yards; and the barra of Aragon, 3 of which make 2½ yards English.

BARRABA, (defart of); a tract of land in Siberia, lying between the rivers Irts and Oby, in the province of Tobolsk. It is uninhabited, but not thro' any deficiency of the soil; for that is excellent for tillage, and part of it might also be laid out in meadows and pastures. It is interspersed with a great number of lakes, which abound with a species of carp called by the neighbouring people *karawuschen*; and the country produces great numbers of elks, deer, foxes, ermine, and squirrels. Between the Irts and Oby are some rich copper-mines; particularly on a mountain called *Piltowa*, from the *pidta* or white firs that grow upon it. Every hundred weight of the ore found here yields 12 pounds of pure copper; and there is no occasion for digging deep in order to come at it. Most of these ores, besides being very rich in copper, yield a great deal of silver, which affords so much gold as makes rich returns for the trouble and expence of extracting it.

BARRACAN, in commerce, a sort of stuff, not diapered, something like camblet, but of a coarser grain. It is used to make cloaks, furtouts, and such other garments, to keep off the rain.—The cities where the most barracans are made in France are, Valenciennes, Lisle, Abbeville, Amiens, and Roan. Those of Valenciennes are the most valued; they are all of wool, both the warp and the woof.

BARRACKS, or **BARACKS**, places for soldiers to lodge in, especially in garrisons.—Barracks, when damp, are greatly prejudicial to the health of the soldiers lodged in them; occasioning dyenteries, intermitting fevers, coughs, rheumatic pains, &c. For which reason, quarter-masters ought to be careful in examining every barrack offered by the magistrates of a place; rejecting all ground-floors in houses that have either been uninhabited, or have any signs of moisture.

BARRATIERE (Philip), a most extraordinary instance of the early and rapid exertion of mental faculties. This surprising genius was the son of Francis Barratiere, minister of the French church at Schwobach near Nuremberg, where he was born Jan. 10th 1721. The French was his mother tongue, together with some words of High Dutch; but by means of his father insensibly talking Latin to him, it became as familiar to him as the rest; so that, without knowing the rules of grammar, he at four years of age talked French to his mother, Latin to his father, High Dutch to the maid or neighbouring children; and all this without mixing or confounding the respective languages. About the middle of his fifth year he acquired Greek in like manner; so that in 15 months he perfectly understood all

the Greek books in the Old and New Testament, which he readily translated into Latin. When he was five years and eight months old, he entered upon Hebrew; and in three years time was so expert in the Hebrew text, that from a bible without points, he could give the sense of the original in Latin or French; or translate extempore the Latin or French versions into Hebrew, almost word for word; and had all the Hebrew psalms by heart. He composed at this time a dictionary of rare and difficult Hebrew words, with critical remarks and philological observations, in about 400 pages in 4to; and, about his tenth year, amused himself for twelve months with the rabbinical writers. With these he intermixed a knowledge of the Chaldaic, Syriac, and Arabic; and acquired a taste for divinity and ecclesiastical antiquity, by studying the Greek fathers, and councils of the first four ages of the church. In the midst of these occupations, a pair of globes coming into his possession, he could in 8 or 10 days time resolve all the problems on them; and in about three months, in Jan. 1735, devised his project for the discovery of the longitude, which he communicated to the Royal Society at London and the Royal Academy of Sciences at Berlin. In June 1731, he was matriculated in the university of Altorf; and at the close of the year 1732, he was presented by his father at the meeting of the reformed churches of the circle of Franconia; who, astonished at his wonderful talents, admitted him to assist in the deliberations of the synod: and to preserve the memory of so singular an event, it was ordered to be registered in their acts. In 1734, the Margrave of Brandenburg Anspach granted this young scholar the use of whatever books he wanted from the Anspach library, together with a pension of 50 florins, which he enjoyed three years; and his father receiving a call to the French church at Stetin in Pomerania, young Barratiere was, on the journey, admitted master of arts, with universal applause, at the university of Hall: at Berlin he was honoured with several conversations with the king of Prussia, and was received into the royal academy. Towards the close of his life he acquired a taste for medals, inscriptions, and antiquities; metaphysical inquiries, and experimental philosophy; intervening occasionally between these studies. He wrote several essays and dissertations; made astronomical remarks, and laborious calculations; took great pains toward a history of the heresies of the anti-trinitarians, and of the 30 years war in Germany: his last publication, which appeared in 1740, was on the succession of the bishops of Rome. The final work he engaged in, for which he had gathered large materials, was *Inquiries concerning the Egyptian Antiquities*. But the substance of this blazing meteor was now almost exhausted: he was always weak and sickly; and died October 5. 1740, aged 19 years 8 months and 16 days. He published eleven different pieces, and left 26 MSS. on various subjects, the contents of which may be seen in his life written by M. Formey professor of philosophy at Berlin.

BARRATOR, or **BARRETOR**, in law, a person guilty of barratry. See **BARRETRY**.

Lambert derives the word *barretor* from the Latin *balatro*, a vile knave: but the proper derivation is from the French *barrateur*, i. e. a deceiver; and this agrees with the description of a common barretor in my Lord Coke's

Barratiere,
Barrator.

Coke's report, *viz.* that he is a common mover and maintainer of suits in disturbance of the peace, and in taking and detaining the possession of houses and lands or goods by false inventions, &c. And therefore it was adjudged, that the indictment against him ought to be in these words, *viz.* That he is *communis malefactor, calumniator et seminator litium et discordiarum inter vicinos suos, et pacis regis perturbator*, &c. And there it is said that a common barrator is the most dangerous oppressor in the law, for he oppresseth the innocent by colour of law, which was made to protect them from oppression.

BARATRY, in law. See **BARRETRY**.

BARATRY, in a shipmaster, is his cheating the owners. If goods delivered on ship-board are embezzled, all the mariners ought to contribute to the satisfaction of the party that lost his goods, by the maritime law; and the cause is to be tried in the admiralty. In a case where a ship was insured against the barratry of the master, &c. and the jury found that the ship was lost by the fraud and negligence of the master, the court agreed, that the fraud was barratry, tho' not named in the covenant; but that negligence was not.

BARRAUX, a fortress of Dauphiny belonging to France. It stands in the valley of Grefivaudan, and was built by a duke of Savoy in 1597. The French took it in 1598, and have kept it ever since. It is seated on the river Iser, in E. Long. 4. 35. N. Lat. 45. o.

BARRAY, one of the Hebrides, or Western isles of Scotland, situate in W. Long. 6. 30. N. Lat. 56. 55.—Of this island Mr Smollet gives the following description. "About two leagues and a half to the south-west of South Vift appears the isle of Barray, or Barra, five miles in length and three in breadth, partly mountainous, and partly capable of cultivation, having the advantage of a commodious harbour on the east side, and a good fishery of cod, ling, and salmon; which last are speckled, surprisngly nimble and shy, inasmuch that the fishermen are obliged to use three nets within one another, that, if the fish springs over two, it may be caught in the third. In the fourth end of Barray, there is an orchard planted with fruit-trees, though few of them produce fruit: but all sorts of pot-herbs and roots grow here in great perfection; nay, the natives even raised tobacco; but it never answered their purpose or expectation. This island, together with the adjacent smaller isles, belongs to the laird of Macneil, said to be the 36th in lineal descent from him of the same name who first possessed this estate. He holds it, however, in vassalage, from Macdonald of Slate, to whom he pays a yearly quit-rent. In the little isle of Kermul, about a quarter of a mile to the southward of Barry, is the family-seat, furnished with a watch-tower, and surrounded by a kind of fortification. The cockman, or watchman, is constantly on the tower to reconnoitre and prevent surprize; and the government of the castle is vested in a constable, who is very cautious of admitting any stranger in the absence of Macneil or his lady. The church of this island is dedicated to St Barr, a wooden image of whom stands on the altar, and of this patron they recite a legend of miracles: hard by is a little chapel in which Macneil and his descendants are interred. The inhabitants are very courteous and hospitable: as soon as any stranger

lands on the island, they oblige him to eat, on the supposition that the keen air of the ocean must have sharpened his appetite. When three or four guests arrive, each, by ancient custom, is lodged in a separate house; and thus man and wife are very often parted. The natives chiefly employ themselves in fishing, and climbing rocks for eggs and sea-fowl. The chief climber is distinguished by the name of *gingich*, or *hero*; and pays dear for his pre-eminence. When the boat approaches the rock, the gingich first leaps upon it, and, with the assistance of an horse-hair rope, draws his companions after him from one precipice to another. At their return to the boats with their booty of eggs and fowls, the gingich, at the hazard of his life, jumps into the vessel, which is generally tossed by a violent agitation of the sea, and keeps her steady to the rock, until the rest enter: in compensation for his courage and dexterity, he is gratified with a larger proportion of their plunder.

When a tenant's wife dies, the husband makes application to Macneil, desiring him to recommend another helpmate, and his request is immediately granted: then he visits her, carrying along with him a bottle of strong waters for the celebration of the marriage, which is consummated without further ceremony. When the husband dies, the widow presents the same petition, and is accommodated in the same manner. Should a tenant lose his milk cows by the severity of the season, or any other misfortune, Macneil is obliged to supply him with the like number; and when an old man is past his labour, the laird maintains him in his own family, for the remaining part of his life.

BARRE (Louis Francois Joseph de la) of Tournay, author of several works printed at Paris. Amongst others, *Imper. Orientale, Recueil des Medailliers, des empereurs*, "Memoirs for the history of France, &c." He died in 1738.

BARREL, in commerce, a round vessel, extending more in length than in breadth, made of wood, in form of a little tun. It serves for holding several sorts of merchandize.

BARREL is also a measure of liquids. The English barrel, wine-measure, contains the eighth part of a tun, the fourth part of a pipe, and one half of a hog-head; that is to say, it contains 31½ gallons: a barrel, beer-measure, contains 36 gallons; and, ale-measure, 32 gallons. The barrel of beer, vinegar, or liquor preparing for vinegar, ought to contain 34 gallons, according to the standard of the ale-quart.

BARREL also denotes a certain weight of several merchandizes, which differs according to the several commodities. A barrel of Essex butter weighs 106 pounds; and of Suffolk butter, 256 pounds. The barrel of herrings ought to contain 32 gallons wine-measure, which amount to about 28 gallons old standard, containing about 1000 herrings. The barrel of salmon must contain 42 gallons; the barrel of eels the same. The barrel of soap must weigh 256 lb.

BARREL, in mechanics, a term given by watch-makers to the cylinder about which the spring is wrapped; and by gun-smiths to the cylindrical tube of a gun, pistol, &c. through which the ball is discharged.

BARREL, in anatomy, a pretty large cavity behind the tympanum of the ear, about four or five lines deep, and five or six wide.

red
ing.
Sir-
Thundering BARRELS, in the military art, are filled with bombs, grenades, and other fire-works, to be rolled down a breach.

BARENNESS, the fame with sterility *.

BARRETRY, in law, is the offence of frequently exciting and stirring up suits and quarrels between his majesty's subjects, either at law or otherwise. The punishment for this offence, in a common person, is by fine and imprisonment: but if the offender (as is too frequently the case) belongs to the profession of the law, a barritor who is thus able as well as willing to do mischief ought also to be disabled from practising for the future. And indeed it is enacted by statute 12 Geo. I. c. 29. that if any one, who hath been convicted of forgery, perjury, subornation of perjury, or common barrettry, shall practise as an attorney, solicitor, or agent, in any suit; the court, upon complaint, shall examine it in a summary way; and, if proved, shall direct the offender to be transported for seven years. Hereunto also may be referred another offence, of equal malignancy and audaciousness; that of suing another in the name of a fictitious plaintiff, either one not in being at all, or one who is ignorant of the suit. This offence, if committed in any of the king's superior courts, is left, as a high contempt, to be punished at their discretion. But in courts of a lower degree, where the crime is equally pernicious, but the authority of the judges not equally extensive, it is directed by statute 3 Eliz. c. 2. to be punished by six months imprisonment, and treble damages to the party injured.

BARRICADE, or BARRICADO, a military term for a fence formed in haste with vessels, baskets of earth, trees, palisades, or the like, to preserve an army from the shot or assault of the enemy.—The most usual materials for barricades consist of pales or stakes, crossed with battoons, and shod with iron at the feet; usually set up in passages or breaches.

BARRICADE, in naval architecture, a strong wooden rail, supported by stanchions, extending across the foremost part of the quarter-deck. In a vessel of war, the vacant spaces between the stanchions are commonly filled with rope-matts, cork, or pieces of old cable; and the upper part, which contains a double rope-netting above the rail, is stuffed with full hammocks to intercept the motion, and prevent the execution of small-shot in time of battle.

BARRIER, in fortification, a kind of fence made at a passage, retrenchment, &c. to stop up the entry thereof. It is composed of great stakes, about four or five feet high, placed at the distance of eight or ten feet from one another, with transoms, or over-thwart rafters, to stop either horse and foot, that would enter or rush in with violence: in the middle is a moveable bar of wood, that opens or shuts at pleasure. A barrier is commonly set up in a void space, between the citadel and the town, in half moons, &c.

BARRETS, signifies that which the French call *jeu de barres*, i. e. *palestra*; a martial exercise of men armed and fighting together with short swords, within certain bars or rails which separated them from the spectators: it is now disused in this country.

BARRING A VEIN, in farriery, an operation performed upon the veins of a horse's legs, and other parts of his body, with intent to stop the course, and lessen the quantity, of the malignant humours that pre-

vail there.

BARRINGTON. See SHUTE.

BARRISTER, is a counsellor learned in the law, admitted to plead at the bar, and there to take upon him the protection and defence of clients. They are termed *jurisconsulti*; and in other countries called *licentiatii in jure*: and anciently barristers at law were called apprentices of the law, in Latin *apprenticii juris nobiliores*. The time before they ought to be called to the bar, by the ancient orders, was eight years, now reduced to five; and the exercises done by them (if they were not called *ex gratia*) were twelve grand moots performed in the inns of Chancery in the time of the grand readings, and 24 petty moots in the term times, before the readers of the respective inns: and a barrister newly called is to attend the six (or four) next long vacations the exercise of the house, *viz.* in Lent and Summer, and is thereupon for those three (or two) years styled a *vacation barrister*. Also they are called *utter barristers*, i. e. pleaders *ouster* the bar, to distinguish them from benchers, or those that have been readers, who are sometimes admitted to plead within the bar, as the king, queen, or prince's counsel are.

BARROS (John), a celebrated Portuguese historian, born at Visco, in 1496. He was educated at the court of king Emanuel, among the princes of the blood, and made a great progress in Greek and Latin. The Infant John, to whom he attached himself, and became preceptor, having succeeded the king his father in 1521, Barros obtained a place in this prince's household; and in 1522, was made governor of St George del Mina, on the coast of Guinea. Three years after, the king having recalled him to court, made him treasurer of the Indies, and this post inspired him with the thought of writing his history; for which purpose he retired to Pompos, where he died, in 1570. His history of Asia and the Indies is divided into decades; the first of which he published in 1552, the second in 1553, and the third in 1563; but the fourth decade was not published till the year 1615, when it appeared by order of King Philip III: who had the manuscript purchased of the heirs of John Barros. Several authors have continued it, so that we have at present 12 decades. He left many other works; some of which have been printed, and others remain in manuscript.

BARROW (Isaac), an eminent mathematician and divine, of the last century, was the son of Mr Thomas Barrow a linen draper in London, where he was born, in 1630. He was at first placed at the charter-house school, for two or three years; where his behaviour afforded but little hopes of success in the profession of a scholar, he being fond of fighting, and promoting it among his school-fellows: but being removed from thence, his disposition took a happier turn; and having soon made a great progress in learning, he was admitted a pensioner of Peter house, in Cambridge. He now applied himself with great diligence to the study of all parts of literature, especially to that of natural philosophy. He afterwards turned his thoughts to the profession of physic, and made a considerable progress in anatomy, botany, and chemistry; after this he studied chronology, astronomy, and geometry. He then travelled into France and Italy, and in a voyage

Barrington
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Barrow.

age from Leghorn to Smyrna, gave a proof of his bravery; for the ship being attacked by an Algerine pirate, he staid upon deck, and with the greatest intrepidity fought, till the pirate, perceiving the stout resistance the ship made, sheered off and left her (a).

At Smyrna he met with a most kind reception from Mr Bretton, the English consul, upon whose death he afterwards wrote a Latin elegy. From thence he proceeded to Constantinople, where he received the like civilities from Sir Thomas Bendish the English ambassador, and Sir Jonathan Dawes, with whom he afterwards preserved an intimate friendship. At Constantinople he read over the works of St Chrysostom, once bishop of that see, whom he preferred to all the other fathers. When he had been in Turkey somewhat more than a year, he returned to Venice. From thence he came home in 1659, through Germany and Holland; and was episcopally ordained by bishop Brownrig. In 1660, he was chosen to the Greek professorship at Cambridge. When he entered upon this province, he intended to have read upon the tragedies of Sophocles; but he altered his intention, and made choice of Aristotle's rhetoric. These lectures having been lent to a friend who never returned them, are irrecoverably lost. July the 16th, 1662, he was elected professor of geometry in Gresham college, by the recommendation of Dr Wilkins, master of Trinity college, and afterwards bishop of Chester. Upon the 20th of May, 1663, he was elected a fellow of the Royal Society, in the first choice made by the council after their charter. The same year the executors of Mr Lucas having, according to his appointment, founded a mathematical lecture at Cambridge, they fixed upon Mr Barrow for the first professor; and tho' his two professorships were not inconsistent with each other, he chose to resign that of Gresham college, which he did May the 20th, 1664. In 1669, he resigned his mathematical chair to his learned friend Mr Isaac Newton, being now determined to give up the study of mathematics for that of divinity. Upon quitting his professorship, he was only a fellow of Trinity college, till his uncle gave him a small sinecure in Wales, and Dr Seth Ward bishop of Salisbury conferred upon him a prebend in his church. In the year 1670, he was created doctor in divinity by mandate; and, upon the promotion of Dr Pearson master of Trinity college to the see of Chester, he was appointed to succeed him by the king's patent bearing date the 13th of February 1672. When the king advanced him to this dignity, he was pleased to say, "he had given it to the best scholar in England." His majesty did not speak from report, but from his own knowledge; the doctor being then his chaplain, he used often to converse with him, and in his humorous way, to call him an "unfair preacher," because he exhausted

every subject, and left no room for others to come after him. In 1675, he was chosen vicechancellor of the university.—The doctor's works are very numerous, and such as do honour to the English nation. They are, 1. Euclid's Elements. 2. Euclid's Data. 3. Optical Letters, read in the public school of Cambridge. 4. Thirteen Geometrical Letters. 5. The Works of Archimedes, the four Books of Apollonius's Conic Sections, and Theodorus's Spherics explained in a new Method. 6. A Lecture, in which Archimedes's Theorems of the Sphere and Cylinder are investigated and briefly demonstrated. 7. Mathematical Lectures, read in the public schools of the university of Cambridge: the above were all printed in Latin; and as to his English works, they are printed together in four volumes folio.—"The name of Dr Barrow (says the reverend and learned Mr Granger) will ever be illustrious for a strength of mind, and a compass of knowledge that did honour to his country. He was unrivalled in mathematical learning, and especially in the sublime geometry; in which he has been excelled only by one man, and that man was his pupil, the great Sir Isaac Newton. The same genius that seemed to be born only to bring hidden truths to light, to rise to the heights or descend to the depths of science, would sometimes amuse itself in the flowery paths of poetry, and he composed verses both in Greek and Latin. He at length gave himself up entirely to divinity; and particularly to the most useful part of it, that which has a tendency to make men wiser and better. He has, in his excellent sermons on the Creed, solved every difficulty and removed every obstacle that opposed itself to our faith, and made divine revelation as clear as the demonstrations in his own Euclid. In his sermons he knew not how to leave off writing till he had exhausted his subject; and his admirable Discourse on the Duty and Reward of Bounty to the Poor, took him up three hours and an half in preaching. This excellent person, who was a bright example of Christian virtue, as well as a prodigy of learning, died on the 4th of May 1677, in the 47th year of his age;" and was interred in Westminster abbey, where a monument, adorned with his bust, was soon after erected, by the contribution of his friends.

BARROWS, in British topography, artificial hillocks or mounds, met with in many parts of Britain, and supposed to have been Roman tumuli, or sepulchral monuments of the ancient Britons. They are either of stones heaped up, or of earth. For the former, more generally known by the name of *cairns*, see CAIRNS.—Of the latter Dr Plott takes notice of two sorts in Oxfordshire: one placed on the military ways; the other in the fields, meadows, or woods; the first sort doubtless of Roman erection, the other more probably erected by the Britons or Danes. We have an exa-

(b) There is another anecdote told of him, which not only shewed his intrepidity, but an uncommon goodness of disposition, in circumstances where an ordinary share of it would have been probably extinguished. He was once in a gentleman's house in the country, where the necessary was at the end of a long garden, and consequently at a great distance from the room where he lodged: as he was going to it before day, for he was a very early riser, a fierce mastiff, who used to be chained up all day, and let loose at night for the security of the house, perceiving a strange person in the garden at that unseasonable time, set upon him with great fury. The doctor caught him by the throat, threw him, and lay upon him; and whilst he kept him down, considered what he should do in that exigence: once he had a mind to kill him; but he altered this resolution, upon recollecting that this would be unjust, since the dog did only his duty, and he himself was in fault for rambling out of his room before it was light. At length he called out so loud, that he was heard by some of the house, who came presently out, and freed the doctor and the dog from the danger they were both in.

examination of the barrows in Cornwall by Dr Williams, in the Phil. Trans. N^o 458. from whose observations we find that they are composed of foreign or adventitious earth; that is, such as does not rise on the place, but is fetched from some distance. Monuments of this kind are also very frequent in Scotland. On digging into the barrows, urns have been found in some of them, made of calcined earth, and containing burnt bones and ashes; in others, stone chests containing bones entire; in others, bones neither lodged in chests nor deposited in urns. These tumuli are round, not greatly elevated, and generally at their basis surrounded with a foss. They are of different sizes; in proportion, it is supposed, to the greatness, rank, and power, of the deceased person.

Ancient Greece and Latium concurred in the same practice with the natives of this island. Patroclus among the Greeks, and Hector among the Trojans, received but the same funeral honours with our Caledonian heroes; and the ashes of Dercennus the Laurentine monarch had the same simple protection. The urn and pall of the Trojan warrior might perhaps be more superb than those of a British leader: the rising monument of each had the common materials from our mother earth.

The snowy bones his friends and brothers place,
With tears collected, in a golden vase.
The golden vase in purple palls they roll'd
Of softest texture and inwrought with gold.
Lest o'er the urn the sacred earth they spread,
And rais'd a tomb, memorial of the dead.

Pope's Homer's Iliad, xxiv. 1003.

Or, as it is more strongly expressed by the same elegant translator, in the account of the funeral of Patroclus;

High in the midst they heap the swelling bed
Of rising earth, memorial of the dead. *Id. xxiii. 319.*

BARROW, in the salt-works, are wicker-cases, almost in the shape of a sugar-loaf, wherein the salt is put to drain.

BARRULET, in heraldry, the fourth part of the bar, or the one half of the cloiset: an usual bearing in coat-armour.

BARRULY, in heraldry, is when the field is divided bar-ways, that is, across from side to side, into several parts.

BARRY (Giral), commonly called *Giraldus Cambrensis*, i. e. *Girald of Wales*, an historian and ecclesiastic in the reigns of Henry II. and Richard I. was born at the castle of Mainarper, near Pembroke, A. D. 1146. By his mother he was descended from the princes of South Wales; and his father, William Barry, was one of the chief men of that principality. Being a younger brother, and intended for the church, he was sent to St David's, and educated in the family of his uncle, who was bishop of that see. He acknowledges, in his history of his own life and actions, that in his early youth he was too playful; but being severely reproached for it by his preceptors, he became a very hard student, and greatly excelled all his school-fellows in learning. When he was about 20 years of age, he was sent, A. D. 1166, for his further improvement, to the university of Paris; where he continued three years, and became, according to his own account, a most excellent rhetorician; which rendered him very famous.

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On his return into Britain, he entered into holy orders, and obtained several benefices both in England and Wales. Observing, with much concern, that his countrymen, the Welsh, were very backward in paying the tithes of wool and cheese, which he was afraid would involve them in eternal damnation, he applied to Richard archbishop of Canterbury, and was appointed his legate in Wales for rectifying that disorder, and for other purposes. He executed this commission with great spirit; excommunicating all, without distinction, who refused to save their souls by surrendering the tithes of their cheese and wool. Not satisfied with enriching, he also attempted to reform, the clergy; and dilated the archdeacon of Brechin to the archbishop, for the unpardonable crime of matrimony; and the poor old man, refusing to put away his wife, was deprived of his archdeaconry; which was bestowed upon our zealous legate. In discharging the duties of this new office, he acted with great vigour, which involved him in many quarrels; but, if we may believe himself, he was always in the right, and always victorious. His uncle, the bishop of St David's, dying A. D. 1176, he was elected his successor by the chapter: but this election having been made without the permission, and contrary to the inclination of Henry II. our author prudently declined to insist upon it, and went again to Paris to prosecute his studies, particularly in the civil and canon law, and theology. He speaks with great raptures of the prodigious fame he acquired by his eloquent declamations in the schools, and of the crowded audiences who attended them, who were at a loss to know whether the sweetness of his voice, the beauty of his language, or the irresistible force of his arguments, were most to be admired. Having spent about four years at Paris, he returned to St David's; where he found every thing in confusion; and the bishop being expelled by the people, he was appointed administrator by the archbishop of Canterbury, and governed the diocese in that capacity to A. D. 1184, when the bishop was restored. About the same time he was called to court by Henry II. appointed one of his chaplains, and sent into Ireland, A. D. 1185, with Prince John. By this prince he was offered the united bishoprics of Fernes and Leighlin; but declined them, and employed his time in collecting materials for his Topography of Ireland, and his History of the conquest of that island. Having finished his Topography, which consisted of three books, he published it at Oxford, A. D. 1187, in the following manner, in three days. On the first day he read the first book to a great concourse of people, and afterwards entertained all the poor of the town; on the second day he read the second book, and entertained all the doctors and chief scholars; and, on the third day, he read the third book, and entertained the younger scholars, soldiers, and burgeses. "A most glorious spectacle! (says he) which revived the ancient times of the poets, and of which no example had been seen in England." He attended Baldwin archbishop of Canterbury, in his progress through Wales, A. D. 1186, in preaching a crusade for the recovery of the Holy Land; in which, he tells us, he was far more successful than the primate; and particularly, that the people were prodigiously affected with his Latin sermons, which they did not understand, melting into tears, and coming in crowds to take the cross. Al-

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though Henry II. as our author assures us, entertained the highest opinion of his virtues and abilities; yet he never would advance him to any higher dignity in the church, on account of his relation to the princes and great men of Wales. But on the accession of Richard I. (A. D. 1189), his prospects of preferment became better: for he was sent for by that prince into Wales to preserve the peace of that country, and was even joined in commission with William Longchamp, bishop of Ely, as one of the regents of the kingdom. He did not, however, improve this favourable opportunity; refusing the bishoprick of Bangor in A. D. 1190, and that of Landaff the year after, having fixed his heart on the see of St David's, the bishop of which was very old and infirm. In A. D. 1192, the state of public affairs, and the course of interest at court, became so unfavourable to our author's views, that he determined to retire. At first he resolved to return to Paris to prosecute his studies; but meeting with some difficulties in this, he went to Lincoln, where William de Monte read lectures in theology with great applause. Here he spent about six years in the study of divinity, and in composing several works. The see of St David's, which had long been the great object of his ambition, became vacant, A. D. 1198, and brought him again upon the stage. He was unanimously elected by the chapter; but met with so powerful an adversary in Hubert archbishop of Canterbury, (who opposed his promotion with great violence), that it involved him in a litigation, which lasted five years, cost him three journeys to Rome, at a great expence, and in which he was at last defeated, A. D. 1203. Soon after this he retired from the world, and spent the last 17 years of his life in a studious privacy, composing many books, of which we have a very correct catalogue in the *Biographia Britannica*. That Gerald of Wales was a man of uncommon activity, genius, and learning, is undeniable; but these and his other good qualities were much tarnished by his insufferable vanity, which must have been very offensive to his contemporaries, as it is highly disgusting to his readers.

BARRY, in heraldry, is when an escutcheon is divided bar-ways, that is, across from side to side, into an even number of partitions, consisting of two or more tinctures, interchangeably disposed: it is to be expressed in the blazon by the word *barry*, and the number of pieces must be specified; but if the divisions be odd, the field must be first named, and the number of bars expressed.

BARRY-Bendy is when an escutcheon is divided evenly, bar and bend-ways, by lines drawn transverse and diagonal, interchangeably varying the tinctures of which it consists.

BARRY-Pily is when a coat is divided by several lines drawn obliquely from side to side, where they form acute angles.

BARFALLI, a kingdom of Africa, bordering on the river Gambia, inhabited by a tribe of negroes called *Jaloffi*. The government of this kingdom is a most despotic monarchy; all people being obliged to prostrate themselves on the earth when any of the royal family makes his appearance. In time of war, every soldier has his share of the booty, and the king but a certain proportion, which is moderate, considering that if he pleased he might keep the whole. The kingdom

is divided into a number of provinces, over which governors called *bumeys* are appointed by the king. These bumeys are absolute within their jurisdictions; but they seldom carry their prerogative so far as to incur the dislike of the people, which would quickly prove fatal to them. The Mahometan religion is professed by the king and his court; though little regard is paid to that part of the impolitor's creed which forbids the use of wine; for the king cannot live without brandy, nor is he ever more devout than when he is drunk. When his majesty is in want of brandy or other necessaries, he sends to beg of the governor of James-fort that he will dispatch a boat with the merchandize he has occasion for; and to purchase this he plunders the neighbouring towns, and seizes a certain number of his subjects whom he sells for slaves to the Europeans in exchange for their commodities. This is his method of supplying himself if he happens to be at peace with his neighbours; for which reason the people are never so happy as when at war; and hence they pursue war with great vigour, and continue it with obstinacy.—The general dress of the people is a kind of loose callicoe surplice, that hangs down below the knee; which they sometimes plait about the waist in a very agreeable manner. They wear a great number of gold trinkets in their hair, ears, noses, and round their necks, arms, and legs; but the women especially are fond of these ornaments. The king of Barfali, whom Moore saw in 1732, had a prodigious number of women: but when he went abroad he was seldom attended by more than two, who seemed to be dressed out in the whole finery and jewels of the seraglio. He had likewise a number of brethren; but it was seldom that he deigned to speak to them: if ever he did them that honour, they were forced to treat him with the same respect as other subjects, and fall prostrate on the earth the moment they came into his presence, notwithstanding they were the presumptive heirs of the crown. It is indeed usual for the king's children to dispute the right of succession with his brethren, and the longest sword generally carries away the prize.

BARSANTI (Francisco), an eminent musical performer and composer, was born at Lucca about the year 1690. He studied the civil law in the university of Padua; but, after a short stay there, chose music for his profession. Accordingly he put himself under the tuition of some of the ablest masters in Italy; and having attained to a considerable degree of proficiency in the science of practical composition, took a resolution to settle in England, and came thither with Geminiani, who was also a Luccese, in the year 1714. He was a good performer on the hautboy, and also on the flute; in the former capacity he found employment in the opera band, and in the latter derived considerable advantages by teaching. He published, with a dedication to the earl of Burlington, six solos for a flute with a thorough-bass, and afterwards six solos for a German flute and a bass. He also made into sonatas, for two violins and a bass, the first six solos of Geminiani. He continued many years a performer at the opera-house: at length, reflecting that there was a prospect of advantage for one of his profession in Scotland, he went thither; and, with greater truth than the same is asserted of David Rizzo, may be said to have meliorated the music of this country, by collecting

ting and making basses to a great number of the most popular Scots tunes. About the year 1750 Barfanti returned to England; but, being advanced in years, he was glad to be taken into the opera band as a performer on the tenor violin; and in the summer season into that of Vauxhall. At this time he published 12 concertos for violins; and shortly after, *Sei Antifone*, in which he endeavoured to imitate the style of Palestrina, and the old composers of motets: but from these publications so little profit resulted, that, towards the end of his life, the industry and economy of an excellent wife, whom he had married in Scotland, and the studies and labours of a daughter, whom he had qualified for the profession of a singer, but who is now an actress at Covent-Garden, were his chief support.

BARTAS (William de Saluste du), a French poet, who lived in the 16th century. He was employed by Henry IV. of France in England, Denmark, and Scotland; and commanded a troop of horse in Gascony, under the marshal de Martignan. He was a Calvinist; and died in 1590, aged 46. He wrote a great number of poems; the most famous of which are, 1. *The Week*, or the Creation of the World, in seven books. 2. *The Poem of Judith*; and 3. *The Battle of Ivry*, gained by Henry IV. in 1590. Du Bartas wrote in a bombast style.

BARTER, or TRUCK, is the exchanging of one commodity for another. The word comes from the Spanish *barator*, to deceive or circumvent in bargaining, perhaps because those who deal this way usually endeavour to over-reach one another.

To transact properly, the price of one of the commodities, and an equivalent quantity of the other, must be found either by practice, or by the rule of three.

Quest. 1. How many pounds of cotton, at 9 d. per lb. must be given in barter for 13 C. 3 Q. 14 lb. of pepper, at 2 l. 16 s. per C.?

Ans. Find the price or value of the commodity whose quantity is given as follows.

	C.	Q.	lb.	L.	s.
	13	3	14	at	2 16
	<hr/>				
	26				
2l.		10	8		
16s.		1	8		
2 Q.			14		
1 Q.			7		
14 lb.		<hr/>			
	L. 38 17				

Secondly. Find how much cotton, at 9 d. per lb. 38 l. 17 s. will purchase, as under.

d. lb. L. s.
If 9 : 1 :: 38 17

20

777

12

9)9324(

C. Q.

Ans. 1036 lb. = 9 1

operation may stand as follows:

C. L. C.

If 1 : 2. 8 :: 13.875

2.8

111000

27750

.0375)38.8500(1036=9 1 Ans.

37. 5. . .

1350

1125

2250

2250

The value or price of the goods received and delivered in barter being always equal, it is obvious that the product of the quantities received and delivered, multiplied in their respective rates, will be equal.

Hence arises a rule which may be used with advantage in working several questions; namely, Multiply the given quantity and rate of the one commodity, and the product divided by the rate of the other commodity quotes the quantity sought; or divided by the quantity quotes the rate.

Quest. 2. How many yards of linen, at 4 s. per yard, should I have in barter for 120 yards of velvet, at 15 s. 6 d.?

2ds. Sixp. Sixp. 2ds.

120 x 31 = 3720, and 8)3720(459 Ans.

BARTH, or BART (John), a brave fisherman of Dunkirk, who rose to the rank of an admiral; and is celebrated for his signal valour and naval exploits, in the annals of France. He died in 1702, aged 51.

BARTHIUS (Caspar), a very learned and copious writer, born at Cultrin in Brandenburg, the 22^d of June 1576. Mr Baillet has inserted him in his *Eruditi Celebres*; where he tells us, that at 12 years of age he translated David's Psalms into Latin verse of every measure, and published several Latin poems. Upon the death of his father (who was professor of civil law at Francfort, counsellor to the elector of Brandenburg, and his chancellor at Cultrin), he was sent to Gotha, then to Eisenach, and afterwards, according to custom, went through all the different universities in Germany. When he had finished his studies, he began his travels; he visited Italy, France, Spain, England, and Holland, improving himself by the conversation and works of the learned in every country. He studied the modern as well as ancient languages, and his translations from the Spanish and French shew that he was not content with a superficial knowledge. Upon his return to Germany, he took up his residence at Leipzig, where he led a retired life, his passion for study having made him renounce all sort of employment. He wrote a vast number of books; the principal of which are, 1. His *Adversaria*, a large volume in folio; the second and third volumes of which he left in manuscript. 2. A Translation of *Aeneas Gazæus*. 3. A large volume of Notes upon Claudian, in 4to. 4. Three large volumes upon Statius; &c. He died at Leipzig, in 1658, aged 71.

BARTHOLINUS (Caspar), a learned physician and anatomist in the 17th century, was born at Malmoe,

If the above question be wrought decimally, the

Bartholinus
Bartholomew.

Bartholomew
Bartholomew.

a town in the province of Schonen, which then belonged to Denmark. At three years of age he had such a quick capacity, that in 14 days he learned to read; and in his 13th year he composed Greek and Latin orations, and pronounced them in public. When he was about 18, he went to the university of Copenhagen, and afterwards studied at Rostock and Wirtemberg. He next set out upon his travels; during which he neglected no opportunity of improving himself at the different universities to which he came, and every where receiving marks of respect. He was in 1613 chosen professor of physic in that university, which he enjoyed 11 years; when, falling into a dangerous illness, he made a vow, that if it should please God to restore him, he would solely apply himself to the study of divinity. He recovered, and kept his word; and soon after obtained the professorship of divinity, and the canonry of Roschild. He died on the 13th of July 1629, after having written several small works, chiefly on metaphysics, logic, and rhetoric.

BARTHOLINUS (Thomas), a celebrated physician, son of the former, was born at Copenhagen in 1616. After studying some years in his own country, he in 1637 went to Leyden, where he studied physic during three years. He then travelled into France; and resided two years at Paris and Montpellier, in order to improve himself under the famous physicians of those universities. Afterwards going to Italy, he continued three years at Padua; and at length went to Basil, where he obtained the degree of doctor of philosophy. Soon after, he returned to Copenhagen; where, in 1647, he was appointed professor of the mathematics; and next year was nominated to the anatomical chair, an employment better suited to his genius and inclination; which he discharged with great assiduity for 13 years, and distinguished himself by making several discoveries with respect to the lacteal veins and lymphatic vessels. His close application, however, having rendered his constitution very infirm, he, in 1661, resigned his chair; but the king of Denmark allowed him the title of *honorary professor*. He now retired to a little estate he had purchased at Hagested, near Copenhagen, where he hoped to have spent the remainder of his days in peace and tranquillity; but his house being burnt in 1650, his library, with all his books and manuscripts, was destroyed. In consideration of this loss the king appointed him his physician, with a handsome salary, and exempted his land from all taxes; the university of Copenhagen also appointed him their librarian; and, in 1675, the king did him the honour to give him a seat in the grand council of Denmark. He wrote, 1. *Anatomia Caspari Bartholini Parentis novis Observationibus primum locupletata*, 8vo. 2. *De Morbis in Natura & Medicina*, 4to. 3. *De Armillis Veterum, præsertim Danorum Schedion*, 8vo; and several other works. This great man died on the 4th of December 1680.

St BARTHOLOMEW'S DAY, a festival of the Christian church, celebrated on the 24th of August. St Bartholomew was one of the twelve Apostles; and is esteemed to be the same as Nathanael, one of the first disciples that came to Christ.

It is thought this apostle travelled as far as India, to propagate the gospel; for Eusebius relates, that a famous philosopher and Christian, named *Pantenus*,

desiring to imitate the apostolical zeal in propagating the faith, and travelling for that purpose as far as India, found there, among those who yet retained the knowledge of Christ, the gospel of St Matthew, written, as the tradition asserts, by St Bartholomew, one of the twelve apostles, when he preached the gospel in that country. From thence he returned to the more northern and western parts of Asia, and preached to the people of Hierapolis; then in Lycaonia; and lastly at Albania, a city upon the Caspian Sea; where his endeavours to reclaim the people from idolatry were crowned with martyrdom, he being (according to some writers) beat'd alive, and crucified with his head downwards.—There is mention made of a Gospel of St Bartholomew, in the preface to Origen's Homilies on St Luke, and in the preface to St Jerom's commentary on St Matthew: but it is generally looked upon as spurious, and is placed by pope Gelasius among the apocryphal books.

BARTHOLOMEW (St), one of the Caribbee islands belonging to the French, who sent a colony thither in 1648. It is about 24 miles in compass, and has a good haven. W. Long. 62. 15. N. Lat. 18. 6.

BARTHOLOMITES, a religious order founded at Genoa in the year 1307; but the monks leading very irregular lives, the order was suppressed by pope Innocent X. in 1650, and their effects were confiscated. In the church of the monastery of this order at Genoa is preserved the image which it is pretended Christ sent to king Abgarus. See *ABGARUS*.

BARTOLOCCI (Julius), a learned monk, and professor of Hebrew at Rome, was born at Celano, in 1613; and distinguished himself by writing an excellent Hebrew and Latin catalogue of the Hebrew writers and writings, in 4 vols folio, a continuation of which was performed by Imbonati his disciple. He died in 1687.

BARTOLOMEO (Francisco), a celebrated painter, born at Savignano, a village 10 miles from Florence, in the year 1469, was the disciple of Cosimo Rosselli, but was much more beholden to the works of Leonardo da Vinci for his extraordinary skill in painting. He was well versed in the fundamentals of design. Raphael, after quitting the school of Perugino, applied to this master; and under him studied the rules of perspective, with the art of managing and uniting his colours. In the year 1500, he turned Dominican friar; and some time after was sent by his superiors to the convent of St Martin, in Florence. He painted both portraits and histories; but his scrupulous conscience would hardly ever suffer him to draw naked figures, though no body understood them better. He died in 1517, aged 48.

BARTON, a town of Lincolnshire, seated on the river Humber, where there is a considerable ferry to pass over into Yorkshire. W. Long. o. 10. N. Lat. 53. 40.

BARTSIA, *PAINTED CUP*; a genus of the angiospermia order, belonging to the didymna class of plants. Of this there are two species: the viscosa, or marshy; and the alpina. The first, called also *yellow marsh eye-bright*, was found by Mr Lightfoot in bogs and marshy places about Loch-Goyl, near Loch-Long in the district of Cowal in Argyshire. The plant is about ten or twelve inches high, with an erect stalk downy and unbranched: the leaves are sessile, spear-shaped, and

such
Basiltes.

a little viscous; the flowers are yellow, and the plant rises black. It is likewise found in marshy places in Cornwall in England. The alpina, or mountain eye-bright cow-wheat, hath heart-shaped leaves placed opposite, and bluntly ferrated, with purple blossoms in leafy spikes. It is likewise a native of Britain, and is found near rivulets in hilly countries. Sheep and goats eat it.

BARUCH (the prophecy of), one of the apocryphal books, subjoined to the canon of the Old Testament. Baruch was the son of Neriah, who was the disciple and amanuensis of the prophet Jeremiah. It has been reckoned part of Jeremiah's prophecy, and is often cited by the ancient fathers as such. Josephus tells us, Baruch was descended of a noble family; and it is said, in the book itself, that he wrote this prophecy at Babylon; but at what time is uncertain. It is difficult to determine in what language this prophecy was originally written. There are extant three copies of it; one in Greek, the other two in Syriac; but which of these, or whether any one of them, be the original, is uncertain.

BARULES, in church-history, certain heretics, who held, that the Son of God had only a phantom of a body; that souls were created before the world, and that they lived all at one time.

BARUTH, an ancient town of Turkey in Syria, with a Christian church of the Nestorian persuasion. It is situated in a fine fertile soil, but is inconsiderable now to what it was formerly. E. Long. 34. 20. N. Lat. 33. 30.

BARUTH, an Indian measure, containing 17 gantans: It ought to weigh about three pounds and an half English avoirdupois.

BARYTONUM, in the Greek grammar, denotes a verb, which having no accent marked on the last syllable, a grave accent is to be understood. In Italian music, *barytono* answers to our common pitch of bass.

BAS CHEVALIER. See **BACHELOR**.

Bas-Relief. See **BASSO-RELIEVO**.

BASALTES, in natural history, is a heavy hard stone, chiefly black or green, consisting of prismatic crystals, the number of the sides of which is uncertain. It is called by English miners *cockle*, and by Germans *schorl*. Its specific gravity is to that of water, as 3000 or upwards to 1000. It is considered by Wallerius as a species of the *cornueus*, or *horn-rock*. Cronstedt enumerates it among the earths which he called *garnet earths*. Basaltes frequently contains iron; and consists either of particles of an indeterminate figure, or of a sparry, striated, or fibrous texture. Black basaltes is called *lapis lydius*, and is used as a touchstone to shew the colours of metals. Basaltes has a stony hardness, is insoluble by acids, and is fusible by fire *.—The most remarkable quality of this is its figure, being never found in strata, like other marbles; but always standing up in the form of regular angular columns, composed of a number of joints, one placed on and nicely fitted to another, as if formed by the hands of a skilful workman. See Plate LV. fig. 9. The basaltes was originally found in columns in Ethiopia, in fragments in the river Tmolus, and some other places: we now have it frequently, both in columns and small pieces, in Spain, Russia, Poland, near Dresden, and in Silesia; but the noblest store in the world seem to be

Basiltes,
Bafan.

that called the *Giant's Causeway*, in Ireland; and Staffa, one of the Western isles of Scotland. In Ireland it rises far up in the country, runs into the sea, crosses its bottom, and rises again on the opposite land. * See **GIANTS Causeway**, and **STAFFA**.

The origin and formation of basaltes has much puzzled the world; but we may consider, that many of the known fossil bodies have a property, like salts, of arranging themselves into different figures at the time of their first coalescence into a mass. This is from the same laws in nature with that of salts; and we are well assured by daily experience, that crystal and spar, according to this natural determination, ever form regularly angular figures, when all the proper accidents have concurred to their concretion. The most common figures of crystals are the hexangular columns; and those of spar, either trigonal columns or parallelepipeds. The combinations and mixture of these, in different degrees, may naturally produce mixed figures, according to these degrees; and a third substance, though in itself not disposed by nature to assume or arrange itself into any particular figure, if mixed with these, may be able to spread, extend, and enlarge the figures they concrete into, or otherwise alter them. A mixture of three bodies is, therefore, capable of producing a fourth, of a figure different from any one of the three above; and we find also, by many parallel instances, that the quicker or slower passing off of the fluid from whence bodies are concreted, is capable of altering their figures.

The marble of the Giants-causeway, or any other columns of basaltes, is found to be composed of an admixture of crystal, spar, and earth. The spar may be procured in its own form; and the remaining mass, after the separation of the spar, is found to be pure crystal, and an earth of the clay kind, seeming the same with the black pipe-clay of Northamptonshire and some other places, only much blacker. We know very well what would be the figures of these bodies concreted alone; and may thence deduce what may be the possible consequences of their union, and the different accidents attending their concretions. But the opinion which seems most likely to prevail at present is, that this substance is a crystallization from some kinds of volcanic lava. See **VOLCANO**.

BASAN, (anc. geog.), a territory beyond Jordan, mentioned in scripture. By Josephus, Eusebius, and Jerom, it is called *Batanea*. On the entering of the Israelites into the land of Canaan, the whole of the country beyond Jordan, from that of the Moabites, or Arabia, as far as mount Hermon and Lebanon, was divided into two kingdoms, viz. that of Sihon king of the Amorites, and of Og king of Basan or *Bashan*; the former to the south, and the latter to the north. The kingdom of Sihon extended from the river Arnon and the country of Moab, to the river Jabbok; which running in an oblique course from the east, was at the same time the boundary of the Ammonites, as appears from Numb. xxi. 24. and Deuteron. ii. 37. and iii. 16. The kingdom of Sihon fell to the lot of the Reubenites and Gadites, and Basan to the half-tribe of Manasseh. To this was annexed a part of the hilly country of Gilead, and the district of Argob; yet so that Basan continued to be the principal and greatest part: but, after the Babylonish captivity, Basan was subdivided;

Gar-

Basartschick
Bafe.

Bafel
Bafha

vided; so that only a part was called *Batanea*, or *Bafan*, another *Trachonitis*, a third *Aurunitis*, or *Iturea*, and some part also *Gaulonitis*; but to settle the limits of each of these parts is a thing now impossible.—Bafhan was a country famous for its pastures and breed of large cattle.

BASARTSCHICK, a considerable town of Romania in Turkey of Europe. It is pretty well built, and hath clean and broad streets; has a great trade; and is situated on the river Meritz, in E. Long. 24. 30. N. Lat. 41. 49.

BASARUCO, in commerce, a small bafe coin in the East Indies, being made only of very bad tin. There are, however, two sorts of this coin, a good and a bad; the bad is one sixth in value lower than the good.

BASE, in geometry, the lowest side of the perimeter of a figure: Thus, the bafe of a triangle may be said of any of its sides, but more properly of the lowest, or that which is parallel to the horizon. In rectangled triangles, the bafe is properly that side opposite to the right angle.

Base of a Solid Figure, the lowest side, or that on which it stands.

Base of a Conic Section, a right line in the hyperbola and parabola, arising from the common intersection of the secant plain and the bafe of the cone.

BASE, in architecture, is used for any body which bears another, but particularly for the lower part of a column and pedestal.—The ancients, in the early times of architecture, used no bases. The Doric columns in the temple of Minerva at Athens have none, but stand immediately upon the floor of the porch. Columns afterwards came to be supported on square pieces called *plinths*, and after that on pedestals. When we fee a column, of whatsoever order, on a pedestal, the bafe is that part which comes between the top of the pedestal and the bottom of the shaft of the column; when there is no pedestal, it is the part between the bottom of the column and the plinth: some have included the plinth as a part of the bafe; but it is properly the piece on which the bafe stands, as the column stands upon that.—The pedestal also has its bafe as well as the column, and the pilaster. The bafe of columns is differently formed in the different orders; but in general it is composed of certain spires or circles, and was thence in early times called the *spire of a column*. These circles were in this case supposed to represent the folds of a snake as it lies rolled up; but they are properly the representations of several larger and smaller rings or circles of iron, with which the trunk of trees which were the ancient columns were furrounded to prevent their burling: these were rude and irregular, but the sculptor who imitated them in stone found the way to make them elegant.

BASE, in fortification, the exterior side of the polygon, or that imaginary line which is drawn from the flanked angle of a bastion to the angle opposite to it.

BASE, in gunnery, the least sort of ordnance, the diameter of whose bore is $1\frac{1}{4}$ inch, weight 200 pound, length 4 feet, load 5 pound, shot $1\frac{1}{2}$ pound wt. and diameter $1\frac{1}{2}$ inch.

BASE, in chemistry. See **BASIS**.

BASE, in law. *Bafe estate*, such as bafe tenants have in their hands. *Bafe tenure*, the holding by vil-

lenage, or other customary services; as distinguished from the higher tenures in *capite*, or by military service. *Bafe fee*, is to hold in fee at the will of the lord, as distinguished from fockage tenure. *Bafe court*, any court not of record.

BASELLA, CLIMBING NIGHTSHADE from *Mala-bar*; a genus of the trigynia order, belonging to the pentandria class of plants.

Species. 1. The *rubra*, with red leaves and simple footstalks, has thick, strong, succulent stalks and leaves, which are of a deep purple colour. The plant will climb to the height of ten or twelve feet, provided it is kept in a stove; but in the open air it will not grow so large in this country; nor will the feeds come to perfection in the open air, unless in very warm seasons. The flowers of this plant have no great beauty, but it is cultivated on account of the odd appearance of its stalks and leaves. There is a variety of this, with green stalks and leaves, and the flowers of a whitish green colour tipped with purple. 2. The *alba*, with oval waved leaves. This sort hath flaccid leaves, and smaller flowers and fruit than the first. The plants will climb to a considerable height, and send forth a great number of branches; so they should be trained up to a trellis, or fastened to the back of the stove, otherwise they will twist themselves about whatever plants stand near them, which will make a very disagreeable appearance.

Culture. These plants are propagated from feeds, which should be sown on a moderate hot-bed in the spring; and when the plants are fit to remove, they should be each planted in a separate pot, and plunged into the tan-bed, where they are to be treated like other tender exotics. They may be also propagated from cuttings, but as they arise so easily from the feeds, the latter method is seldom practised.

Uses. The berries of the first species are said to be used for staining calicoes in India. Mr Miller assures us, that he has seen a very beautiful colour drawn from them, but which did not continue long when used in painting. He is of opinion, however, that a method of fixing the colour might be invented, in which case the plant would be very useful.—This, we apprehend, might be accomplished by means of solution of tin in aqua regia, which hath a surprising effect both in brightening and giving durability to other vegetable colours.

BASEMENT, in architecture. See **ARCHITECTURE**, n^o 75. 76.

BASHARIANS, a sect of Mahometans, being a branch or subdivision of the Motazalites. The Basharians are those who maintain the tenets of Bafhar Ebn Motamer, a principal man among the Motazalites, who varied, in some points, from the general tenets of the sect, as carrying man's free agency to a great length, and even to the making him independent.

BASHAW, a Turkish governor of a province, city, or other district.

A bashaw is made with the solemnity of carrying a flag or banner before him, accompanied with music and songs, by the miralem, an officer on purpose for the investiture of bashaws. *Bafhaw*, used absolutely, denotes the prime vizier; the rest of the denomination being distinguished by the addition of the province, city, or the like, which they have the command of; as the bashaw of Egypt, of Palestine, &c. The bashaws

shaws are the emperor's sponges. We find loud complaints among Christians of their avarice and extortions. As they buy their governments, every thing is venal with them. When glutted with wealth, the emperor frequently makes them a present of a bow-string, and becomes heir to all their spoils.

The appellation *basiliensis* is given by way of courtesy to almost every person of any figure at the grand signior's court.

BASIL (St) the Great, one of the most learned and eloquent doctors of the church, was born at Cæsarea, in Cappadocia, about the year 328; and went to finish his studies at Athens, where he contracted a strict friendship with St Gregory Nazianzen. He returned to his native country in 355, where he taught rhetoric. Some time after, he travelled into Syria, Egypt, and Lybia, to visit the monasteries of these countries; and the monastic life so much suited his disposition, that upon his return home he resolved to follow it, and he was the first institutor thereof in Pontus and Cappadocia*. His reputation became so great, that, upon the death of Eusebius bishop of Cæsarea, in 370, he was chosen his successor. It was with some difficulty that he accepted of this dignity; and no sooner was he raised to it, than the emperor Valens began to persecute him because he refused to embrace the doctrine of the Arians. Being at length let alone, he began to use his utmost endeavours to bring about a reunion betwixt the eastern and western churches, who were then much divided about some points of faith, and in regard to Meletius and Paulinus two bishops of Antiochia. But all his efforts were ineffectual, this dispute not being terminated till nine months after his death. Basil had a share in all the disputes which happened in his time in the east in regard to the doctrine of the church; and died the 1st of January, 379.—There have been several editions of his works in Greek and Latin. The best is that of Father Garnier, printed in Greek and Latin, in three volumes folio. St Basil's style is pure and elegant, his expressions grand and sublime, his thoughts noble and full of majesty; and Erasmus places him among the greatest orators of antiquity.

BASIL, a Canton of Switzerland, which joined the confederacy in 1501. It is bounded on the south by the canton of Solothurn; on the north by part of the margravate of Baden Dourlach, and the territory of Rheinfelden; on the east by Frickthal; and on the west by part of Solothurn, the diocese of Basil, and the Sundgau; being upwards of 20 miles in length, and about 18 in breadth. It is entirely Protestant; and contains 27 parishes, and seven bailiwicks. The lower parts of it are fruitful in corn and wine, and also fit for pasture; but the mountains are extremely barren. Here are many medicinal springs and baths, and the air is wholesome and temperate. Both men and women for the most part wear the French dress; but the language commonly spoken is the High-Dutch, tho' the French also is much used. The government is aristocratical; and its revenues arise chiefly from secularized abbeys, and imposts on goods carried through the country, to and from France, Italy, and Germany. Besides the military establishment of the city of Basil, there are two provincial regiments, consisting each of ten companies, and a troop of dragoons.—The places of most note are

Basil the capital, Wallenburg, St Jacob, Neue-Haus, &c.

BASIL, the capital of the canton of that name, is the largest city in all Switzerland, having 220 streets, and six market-places or squares. Its environs are exceeding beautiful, consisting of a fine level tract of fields and meadows. The city is divided into two parts by the Rhine, over which there is a handsome bridge. It is thought by some to have risen on the ruins of the old Augusta Rauracorum. For its name of *Basil* it is indebted to Julian the Apostate, who would have it so called in honour of his mother Basilina. It is fortified with walls, moats, towers, and bastions, and contains several churches, besides the cathedral, which is an old Gothic structure; a commandery of the order of St John, and another of the Teutonic order; a public granary and arsenal; a stately town-house, in which is an exquisite piece of the sufferings of Christ, by Holbein, and a statue of Munatius Plancus, a Roman general, who, about 50 years before Christ, built the ancient city of Augusta Rauracorum; an university, which was founded in 1459, and has a curious physic-garden, library, and museum; a gymnasium; a stately palace, belonging to the margrave of Baden-Dourlach; besides a chamber of curiosities, several hospitals, &c. In the arsenal is shewn the armour in which Charles the Bald lost his life, with the furniture of his horse, and the kettle-drums and trumpets of his army. On the stair-case of the council-house, is a picture of the last judgment, in which, though drawn before the reformation, popes, cardinals, monks, and priests, are represented in the torments of hell. Over-against the French church, on a long covered wall, is painted the dance of death; where the king of terrors is represented as mixing with all ranks and ages, and complimenting them, in German verses, on their arrival at the grave. St Peter's square, planted with elm and lime-trees, makes a pleasant walk; but a spot regularly planted with trees, close by the river, and near the minster, makes still a finer, as commanding a most beautiful and extensive prospect. The celebrated Erasmus died here, in 1536, in the 70th year of his age, and was buried in the great church. He left his library and cabinet of rarities to one Amberbach, a learned lawyer of this city, of whose heirs they were purchased by the university. Besides this cabinet, there are several other curious private ones. The clocks of this city go an hour faster than elsewhere, except at Constance; a circumstance which some ascribe to the famous councils held there, when it was thought the best expedient to bring the fathers earlier to the assembly, for the quicker dispatch of business; but others say, that, in Basil, it was owing to a conspiracy being defeated by that means. Trade still flourishes here, especially in silk, ribbons, and wines; and the police is under excellent regulations. Most of the offices are bestowed by lot among well qualified persons. No person, without the city, must wear lace of gold or silver. All young women are prohibited from wearing silks; and the nearest relations only are to be invited to a marriage-feast. For the government of the city there are several councils or colleges, and officers. Of the last, the two burgomasters, and two wardens of trades, are the chief. The great council is composed of the representatives of the several companies of the greater and lesser city. Basil was the see

Basil.

of a bishop till the Reformation; but though there is one that still bears the title, he has now no jurisdiction here, and lives at Porentru, near the Upper Alface. The two Buxtorffs, father and son, and the famous painter Holbein, were natives of this place. The council held here, in 1431, sat in the vestry of the cathedral.

BASIL, in botany. See **OXYMUM**.

BASIL, among joiners, the sloping edge of a chisel, or of the iron of a plane, to work on soft wood: they usually make the basil 12 degrees, and for hard wood 18; it being remarked, that the more acute the basil is, the better the instrument cuts; and the more obtuse, the stronger, and fitter it is for service.

BASILIAN MONKS; Religious of the order of St Basil. That saint, having retired into a desert, in the province of Pontus, founded a monastery for the convenience of himself and his numerous followers: and for the better regulation of this new society, he drew up in writing the orders and rules he would have them follow. This new order soon spread all over the east; nor was it long before it passed into the west. The rule of St Basil was approved by pope Liberius, the same year in which it was written and published; and afterwards by several other popes; and, in these last ages, by pope Gregory XIII. who approved the abridgement made of it by cardinal Bessarion, in the pontificate of Eugenius IV.—Some authors pretend, that St Basil, before he died, saw himself the spiritual father of more than 90,000 monks, in the east only. But this order, which flourished so greatly for more than three centuries, was afterwards considerably diminished by heresy, schism, and a change of empire. The greatest storm it felt, was in the reign of Constantine Copronymus; who persecuted the monks of St Basil, imprisoning some, and banishing others; inasmuch that the monasteries were abandoned and spoiled of all their goods.

The historians of this order tell us, that it has produced 1805 bishops; and beatified, or acknowledged as saints, 3010 abbots, 11,805 martyrs, and an infinite number of confessors and virgins. They likewise place among the religious of the order of St Basil 14 popes, some cardinals, and a very great number of patriarchs, archbishops, and bishops. This order likewise boasts of several emperors and empresses, kings and queens, princes and princesses, who have embraced its rule.

This order was introduced in the west in 1057; and was reformed in 1569, by pope Gregory XIII. who united the religious of this order in Italy, Spain, and Sicily, into one congregation; of which the monastery of St Saviour at Messina is the chief, and enjoys pre-eminence over the rest. Each community has its particular rule, besides the rule of St Basil, which is very general, and prescribes little more than the common duties of a Christian life.

BASILIC, or **BASILICA**, in the ancient architecture, denotes a kind of public hall or court of judicature, where the princes or magistrates sat to administer justice. The word is originally Greek, *Basileus*, *q. d.* royal house, palace. In after times the denomination *basilica* was also given to other buildings of public use, as town-houses, exchanges, and the like.

BASILIC is also used, in ecclesiastical writers, for a church. In which sense, this name frequently occurs

in St Ambrose, St Austin, St Jerom, Sidonius Apollinaris, and other writers of the fourth and fifth centuries. It is thought that the name was thus applied, from many of the ancient churches having been formed of the Roman halls mentioned in the preceding article. In reality, on the conversion of Constantine, many of the ancient *basilicae* were given to the church, and turned to another use, viz. for Christian assemblies to meet in, as may be collected from that passage in Ausonius, where speaking to the emperor Gratian, he tells him, the *basilicae*, which heretofore were wont to be filled with men of business, were now thronged with votaries praying for his safety. By which he must needs mean, that the Roman halls or courts were turned into Christian churches: and hence, we conceive, the name *basilica* came to be a general name for churches in after ages.

BASILICS, in literary history, a name supposed to have been given by the emperor Leo to a collection of laws in honour of his father Basilus Macedo, who began it in the year 867, and in the execution chiefly made use of Sabbathius Protospatharius, who carried the work as far as 40 books. Leo added 20 books more, and published the work in 880. The whole, 30 years after, was corrected and improved by Constantine Porphyrogenitus, son of Leo; whence many have held him the author of the *basilica*.—Six books of the *basilica* were translated into Latin in 1557, by Gentian Hervetus. An edition of the Greek *basilics*, with a Latin version, has been since published at Paris, in 1647, by Annib. Fabrotius, in 7 volumes. There still want 19 books, which are supposed to be lost. Fabrotius has endeavoured to supply, in some measure, the defect from the synopsis of the *basilica*, and the glosses; of which several had been made under the succeeding emperors, and contained the whole Justinian law, excepting the superfluities, in a new and more consistent order, together with the later constitutions of the emperors posterior to Justinian.

BASILICA, in anatomy, the interior branch of the axillary vein, running the whole length of the arm.

BASILICATA, a territory of Italy, bounded on the north by the Otranto, Bari, and Capitanata; on the west by the Principato, and a small part of the Tuscan sea; on the south by Calabria; and on the east by the gulph of Taranto. It is watered by several rivers: but, as it is almost all occupied by the Apennine mountains, it is neither very populous nor fertile; however it produces enough to maintain its inhabitants, and has a small quantity of cotton. The principal towns are Cirenza the capital, Mesi, Turfi, Rapollo, Muro, Lavello, Tracarico, Monte Peloso and Venoso, which are all episcopal sees.

BASILICI, a denomination given in the Greek empire to those who carried the emperor's orders and commands.

BASILICON, in pharmacy, a name given to several compositions to be found in ancient medicinal writers. At present it is confined to three official ointments, distinguished by the epithets black, yellow, and green. See **PHARMACY**, n° 995.

BASILIDIANS, ancient heretics, the followers of Basilides, an Egyptian, who lived near the beginning of the second century. He was educated in the Gnostic school, over which Simon Magus presided; with whom

whom he agreed that Christ was a man in appearance, that his body was a phantom, and that he gave his form to Simon the Cyrenian, who was crucified in his stead. We learn from Eusebius, that this heresiarch wrote 24 books upon the gospel, and that he forged several prophets; to two of which he gave the names *Baraba* and *Barceph*. We have still the fragment of a Basilidian gospel. His disciples supposed there were particular virtues in names; and taught with Pythagoras and Plato, that names were not formed by chance, but naturally signified something.—Basilides, to imitate Pythagoras, made his disciples keep silence for five years.

In general, the Basilidians held much the same opinions with the Valentinians, another branch of the gnostic family. They asserted, that all the actions of men are necessary; that faith is a natural gift, to which men are forcibly determined, and should therefore be saved tho' their lives were ever so irregular. Irenæus and others assure us, they acted consistently with their principle; committing all manner of villanies and impurities, in confidence of their natural election. They had a particular hierarchy of divine persons, or *Eons*. Under the name *Abraxas*, they are said to have worshipped the supreme God, from whom as a principle, all other things proceeded. There are several gems still subsisting inscribed with the name *Abraxas*, which were used by the Basilidians as amulets against diseases and evil spirits. See *ABRAXAS* and *ABRAK*.

BASILIPPUM, (anc. geogr.), a town of Bætica in Spain; now *Cantillana*, a citadel of Andalusia, above Seville on the Guadalquivir. See *CANTILLANA*.

BASILISCUS, in zoology, the trivial name of a species of lacerta. See *LACERTA*.

BASILISK, a fabulous kind of serpent, said to kill by its breath or sight only. Galen says, that it is of a colour inclining to yellow; and that it has three little eminences upon its head, speckled with whitish spots, which have the appearance of a fort of crown. Ælian says, that its poison is so penetrating, as to kill the largest serpents with its vapour only; and that if it but bite the end of any man's stick, it kills him. It drives away all other serpents by the noise of its hissing. Pliny says, it kills those who look upon it.—The generation of the basilisk is not less marvellous, being said to be produced from a cock's egg, brooded on by a serpent. These and other things equally ridiculous are related by Matthioli, Galen, Dioscorides, Pliny, and Erasistratus. Hirschmayer and Vander Wiel have given the history of the basilisk, and detected the folly and imposture of the traditions concerning it.—In some apothecaries shops there are little dead serpents shewn, which are said to be basilisks. But these seem rather to be a kind of small bird, almost like a cock but without feathers: its head is lofty, its wings are almost like a bat's, its eyes large, and its neck is very short. As to those which are shewn and sold at Venice, and in other places, they are nothing but little thornbacks artificially put into a form like that of a young cock, by stretching out their fins, and contriving them with a little head and hollow eyes: and this, Calmet says, he has, in reality, observed in a supposed basilisk, at an apothecary's shop at Paris, and in another at the Juits of Pont-a-Mousson.

BASILISK, in military affairs, a large piece of ordnance.

nance, thus denominated from its resemblance to the supposed serpent of that name. The basilisk throws an iron ball of 200 pound weight. It was much talked of in the time of Solymán emperor of the Turks, in the wars of Hungary; but seems now out of use. Paulus Jovius relates the terrible slaughter made by a single ball from one of these basilisks in a Spanish ship; after penetrating the boards and planks in the ship's head, it killed above 30 men. Masséus speaks of basilisks made of brass, which were drawn each by 100 yoke of oxen.—Modern writers also give the name *basilisk* to a much smaller and fizeable piece of ordnance, which the Dutch make 15 feet long, and the French only 10. It carries 48 pounds.

BASILIUS, surnamed the *Macedonian*, emperor of the Greeks. He was a common soldier, and of an obscure family in Macedonia, and yet raised himself to the throne; for having pleased the emperor Michael by his address in the management of his horses, he became his first equerry, and then his great chamberlain. He at length assassinated the famous Bardas, and was associated to the empire in 849. He held the eighth general council at Constantinople; deposed the patriarch Photius, but in 858 restored him to the patriarchate; and declared against the popes, who refused to admit him into their communion. He was dreaded by his enemies the Saracens, whom he frequently vanquished; and loved by his subjects, for his justice and clemency. He died in 886. Under his reign the Russians embraced Christianity, and the doctrine of the Greek church. He ought not to be confounded with Basilus the Young, who succeeded Zemiseis in 975, and after a reign of 50 years died in 1025.

BASINGSTOKE, a corporation town of Hampshire in England, and a great thoroughfare on the western road. It is seated on a small brook, in W. Long. 1. 10. N. Lat. 51. 20.

BASIOGLOSSUS, a muscle arising from the base of the os hyoides. See *ANATOMY*, *Table of the Muscles*.

BASIS, or *BASE*, in geometry. See *BASE*.

Basís, or *Base*, in chemistry. Any body which is dissolved by another body, which it receives and fixes, and with which it forms a compound, may be called the *basís* of that compound. Thus, for example, the bases of neutral salts are the alkaline, earthy, and metallic matters which are saturated by the several acids, and form with them these neutral salts. In this sense it is that these neutral salts are called *salts with earthy bases*, *salts with alkaline bases*, *salts with metallic bases*: also the appellations *basís of alum*, *basís of nitre*, *basís of Glauber's salt*, *basís of vitriol*, &c. signify the argillaceous earth, which, with the vitriolic acid, forms alum; the vegetable alkali, which, with the nitrous acid, forms nitre; the mineral alkali, which, with the vitriolic acid, forms Glauber's salt; and the metal which, with the vitriolic acid, forms a vitriol; because these substances are supposed to be fixed, unactive, and only yielding to the action of the acids, which they fix, and to which they give a body and consistence.

Basís, among physicians, denotes the principal ingredients in compound medicines.

BASKET, a machine made of twigs interwoven together, in order to hold fruit, earth, &c. It denotes an uncertain quantity; as, a basket of medlars is two bushels, of assa fetida from 20 to 50 pound weight.

Basilisk
Basket.

Basket
Baskin.
Baskin.

BASKETS of *Earth*, in the military art, called by the French *corbeilles*, are small baskets used in sieges, on the parapet of a trench, being filled with earth. They are about a foot and a half high, about a foot and a half in diameter at the top, and 8 or 10 inches at bottom; so that, being set together, there is a fort of embrasures left at their bottoms, thro' which the soldiers fire, without exposing themselves.

BASKET-Fish, or *Arboreſcent Sea-star*. See **ASTEROIAS**.

BASKET-Salt, that made from ſalt-ſprings, being purer, whiter, and compoſed of finer grains, than the common brine-ſalt. See **SALT**.

BASKING-SHARK, or *SUN-FISH* of the *Iriſh*. See **SQUALUS**.

BASNAGE (James), a learned and accompliſhed author, and paſtor of the Walloon church at the Hague, was born at Roan in Normandy, Auguſt 8, 1653. He was the ſon of Henry Baſnage, one of the ableſt advocates in the parliament of Normandy. At 17 years of age, after he had made himſelf maſter of the Greek and Latin authors, as well as the Engliſh, Spaniſh, and Italian languages, he went to Geneva, where he began his divinity ſtudies under Meltezat, Turretin, and Tronchin; and finiſhed them at Sedan, under the profeſſors Jurieu and Le Blanc de Beaulieu. He then returned to Roan, where he was received as miniſter, September 1676; in which capacity he remained till the year 1685, when, the exerciſe of the Proteſtant religion being ſuppreſſed at Roan, he obtained leave of the king to retire to Holland. He ſettled at Rotterdam; and was a miniſter penſionary there till 1691, when he was choſen paſtor of the Walloon church of that city. In 1709, penſionary Heiſius got him choſen one of the paſtors of the Walloon church at the Hague, intending not only to employ him in religious but in ſtate affairs. He was employed in a ſecret negociation with marſhal d'Uxelles, plenipotentiary of France at the congreſs of Utrecht; and he executed it with ſo much ſucceſs, that he was afterwards truſted with ſeveral important commiſſions, all which he diſcharged in ſuch a manner as to gain a great character for his abilities and addreſs; a celebrated modern writer has therefore ſaid of him, that he was fitter to be miniſter of ſtate than of a pariſh. The abbe du Bois, who was at the Hague in 1716, as ambaffador plenipotentiary from his moſt Chriſtian majeſty, to negotiate a defensive alliance between France, England, and the States General, was ordered by the duke of Orleans, regent of France, to apply himſelf to M. Baſnage, and to follow his advice: they accordingly acted in concert, and the alliance was concluded in January 1717. He kept an epistolary correſpondence with ſeveral princes, noblemen of high rank, and miniſters of ſtate, both Catholic and Proteſtant, and with a great many learned men in France, Italy, Germany, and England. The Catholics eſteemed him no leſs than the Proteſtants; and the works he wrote, which are moſtly in French, ſpread his reputation almoſt all over Europe: among theſe are, 1. *The Hiſtory of the Religion of the Reformed Churches*. 2. *Jewiſh Antiquities*. 3. *The Hiſtory of the Old and New Teſtament*; and many others. He died Sept' 22, 1723.

BASNAGE (Henry) ſieur de Beaulieu, ſecond ſon to Henry Baſnage, and brother to James mentioned in the

laſt article. He applied himſelf to the ſtudy of the law, and was admitted advocate in the parliament of Roan in the year 1679. He did not follow the bar immediately upon his admiſſion; but went to Valencia, where he ſtudied under M. de Marville. Upon his return from thence, he practiſed with great reputation till the year 1687, when the revocation of the edict of Nantz obliged him to fly to Holland, where he compoſed the greateſt part of his works, and died there the 29th of March 1710. His chief work is *Hiſtoire des ouvrages des Scavans*. Rotterd. 24 vol. in duodecimo. This work was begun in the month of September 1687, and continued till June 1709. When he arrived in Holland, Mr Bayle, through indiſpoſition, had been obliged to drop his *Nouvelles de la Republique des lettres*, which induced Mr Baſnage to undertake a work of the ſame kind under a different title.

BASON, in hydraulics, a reſervoir of water, uſed for various purpoſes: thus we ſay, *The baſon of a jet d'eau*, the *baſon of a fountain*, and likewiſe *the baſon of a port or harbour*.

BASON, in Jewiſh antiquities, the laver of the tabernacle, made of the braſs looking-glaſſes belonging to thoſe devout women that watched and ſtood centinels at the door of the tabernacle.

BASON, in mechanics, a term uſed by glaſs-grinders for a diſh of copper, iron, &c. in which they grind convex glaſſes, as concave ones are formed on ſpheres: and by ladders for a round iron mould, in which they form the matter of their hats; and alſo for a leaden one for the brims of hats, having an aperture in the middle, of a diameter ſufficient for the largeſt block to go through.

BASQUES, a ſmall territory of France, towards the Pyrenean mountains. It comprehends Labour, Lower Navarre, and the diſtrict of Soule.

BASS, the loweſt in the four parts of muſic: of uncertain etymology; whether from the Greek word *βασις*, a foundation; or from the Italian adjective *basso*, ſignifying low. Of all the parts it is the moſt important, and it is upon this that the chords proper to conſtitute a particular harmony are determined. Hence the maxim among muſicians, that when the baſs is properly formed, the harmony can ſcarcely be bad.

Baſſes are of different kinds. Of which in their order.

Thorough-Bass is the harmony made by the baſſ-ſviols, or theorbos, continuing to play both while the voices ſing, and the other inſtruments perform their parts, and alſo filling up the intervals when any of the other parts ſtop. It is played by figures marked over the notes, on the organ, ſpinet, harpſichord, &c. and frequently ſimply and without figures on the baſſ-viol and baſſoon.

Counter-Bass is a ſecond or double baſs, where there are ſeveral in the ſame concert.

BASS-VIOLE, a muſical inſtrument of the like form with that of a violin, but much larger. It is ſtruck with a bow, as that is; has the ſame number of ſtrings; and has eight ſtops, which are ſubdivided into ſemiſtops: Its ſound is grave, and has a much nobler effect in a concert than that of the violin.

BASS (ISLE OF), a rock, about a mile in circumference, in the mouth of the Frith of Forth, at a ſmall diſtance from the town of North Berwick in Eaſt Lothian.

Baſon
Baſon.
Baſon.

Bassan
||
Bassan.

thian. It is steep and inaccessible on all sides, except the south-west; and even there it is with great difficulty that a single man can climb up with the help of a rope or ladder. It was formerly kept as a garrison. A party of king James's adherents surprized it at the Revolution, and it was the last place in the three kingdoms that submitted to the new government; upon which, its fortifications were ordered to be neglected. In summer, this remarkable rock, which rises to a great height above the water, in form of a cone, is quite covered with sea-fowl which come hither to breed. The chief of these are the solan geese*, which arrive in June, and retire in September. It also contains a small warren for rabbits, and affords pasture for a few sheep. The force of the tides have now almost worn a hole quite thro' this rock. W. Long. 2. 15. N. Lat. 56. 3.

BASSAN (James de Pont), or LE BASSAN, a celebrated Venetian painter, excelled in landscapes and animals. His works are spread all over Europe; many of them were purchased by Titian; and there are several in the French king's cabinet, the royal palace, and the Hotel de Toulouse. He died in 1592, aged 82.

—Francis and Leander, his sons, distinguished themselves in the same art; but inheriting a species of lunacy from their mother, both came to an untimely end.

BASSANI (Giovanni Battista), maestro di cappella of the cathedral church of Bologna about the middle of the last century, was a very voluminous composer of music, having given to the world no fewer than 31 different works. He is equally celebrated both as a composer for the church and for concerts; and was besides a celebrated performer on the violin, and, as it is said, taught Corelli on that instrument. His compositions consist of masses, psalms, motets with instrumental parts, and sonatas for violins: his fifth opera in particular, containing 12 sonatas for two violins and a bass, is much esteemed; it is written in a style wonderfully grave and pathetic, and abounds with evidences of great learning and fine invention. The first and third operas of Corelli are apparently formed after the model of this work. Bassani was one of the first who composed motets for a single voice, with accompaniments of violins; a practice which is liable to objection, as it assimilates church-music too nearly to that of the chamber; and of his solo-motets it must be confessed that they differ in style but little from opera airs and cantatas: two operas of them, viz. the eighth and thirteenth, were printed in London, by Pearson, above 50 years ago, with the title of *Harmonia Festiva*.

BASSANTIN (James), a Scotch astronomer, son of the laird of Bassantin in Mers, was born in the reign of James IV. He was educated at the university of Glasgow, travelled through Germany and Italy, and then fixed his abode in the university of Paris, where he taught mathematics with great applause. Having acquired some fortune in this occupation in 1562, he returned to Scotland, where he died in the year 1568. From his writings, he appears to have been no contemptible astronomer, considering the times; but, like most of the mathematicians of that age, he was not a little addicted to judicial astrology. Sir James Melvil, in his Memoirs, says that his brother Sir Robert, when he was exerting his abilities to reconcile the two queens Elizabeth and Mary, met with one Bassantin, a man learned in the high sciences, who told him, "that all

Basse
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Bassora.

his travel would be in vain; for, said he, they will never meet together; and next, there will never be any thing but dissembling and secret hatred for a while, and at length captivity and utter wreck to our queen from England." He added, "that the kingdom of England at length shall fall, of right, to the crown of Scotland; but it shall cost many bloody battles; and the Spaniards shall be helpers, and take a part to themselves for their labour." Sir James Melvil is an author of credit; therefore it is probable that our astrologer ventured to utter his prediction: but, as it proved true only in part, either he misunderstood the stars, or they deceived the astrologer.—His works are, 1. *Astronomia Jacobi Bassantini Scoti, opus absolutissimum, &c. per editum Latine et Gallice*. Geneva, 1599, fol. This is the title given it by Tornæsius, who translated it into Latin from the French, in which language it was first published. 2. *Paraphrase de P. Astralabe, avec une amplification de l'usage de P. Astralabe*. Lyons 1555. Paris, 1617, 8vo. 3. *Mathematicæ, genethliacæ*. 4. *Arithmetica*. 5. *Musica secundum Platonem*. 6. *De mathematicis in genere*.

BASSE, or Bass, a town of the French Netherlands, in the county of Flanders, on the confines of Artois, remarkable on account of the many sieges it has sustained; but its fortifications are now demolished. It is seated on a canal which runs as far as Deule. E. Long. 3. 0. N. Lat. 50. 53.

BASSE Terre, part of the island of St Christopher's, one of the Caribbee islands, formerly occupied by the French, but ceded to Great Britain by the treaty of Utrecht in 1713.

BASSET, a game at cards, said to have been invented by a noble Venetian, for which he was banished. The persons concerned in it are a dealer, or banker; his assistant, who supervises the losing cards; and the pinter, or any one who plays against the banker.

BASSET (Peter), a gentleman of a good family, was chamberlain, or gentleman of the privy-chamber, to king Henry V. a constant attendant on that brave prince, and an eye-witness of his most glorious actions both at home and abroad; all which he particularly described in a volume intitled, *The Acts of king Henry V.* which remains in MS. in the college of heralds.

BASSOON, a musical instrument of the wind sort, blown with a reed, furnished with 11 holes, and used as a bass in a concert of hautboys, flutes, &c.—To render this instrument more portable, it is divided into two parts, whence it is also called a *sagot*. Its diameter at bottom is nine inches, and its holes are stopped like those of a large flute.

BASSORA, BALSORA, or *Basrah*, a city between Arabia and Persia, situated in the extremity of the deserts of Irak, a little to the west of the Tigris, in about 57° east longitude, and 30° north latitude. It was built by the command of the khulif Omar, in the 15th year of the Hegira, for the sake of carrying on more commodiously an extensive commerce between the Syrians, Arabian, Persians, and Indians. It is at present a very famous emporium of the east; and stands upon a thick stony soil, as the word *basra* imports, about a day and a half's journey from one of the mouths of the Tigris, where it empties itself into the Persian Gulf, denominated likewise from this town the *Bay of Basrah*. The circumjacent tract is looked upon by the

Bassora
Bassord.

Arabs to be one of the most delightful spots in Asia, and even as one of the most beautiful gardens in the world; however, the hot winds that frequently blow there are very troublesome to travellers, and sometimes overwhelm them with sand driven by the force of these winds out of the neighbouring deserts. The city is inhabited by Jacobites, Nestorians, Jews, Mahometans, and Chaldean Christians, commonly called *Christians of St John*, which last are pretty numerous here.

The Abbe Raynal values the merchandise annually brought to Bassora at L. 525,000: of which the English furnish L. 175,000; the Dutch L. 87,500; and the Moors, Banians, Armenians, and Arabs, furnish the remainder. "The cargoes of these nations (says he) consist of rice; sugar; plain, striped, and flowered muslins from Bengal; spices from Ceylon and the Molucca islands; coarse, white, and blue cottons from Coromandel; cardamum, pepper, sanders-wood, from Malabar; gold and silver stuffs, turbans, shawls, indigo, from Surat; pearls from Baharen, and coffee from Mocha; iron, lead, and woollen-cloth, from Europe. Other articles of less consequence are imported from different places. Some of these commodities are shipped on board small Arabian vessels; but the greater part is brought by European ships, which have the advantage of a considerable freight.

"This merchandise is sold for ready money; and passes through the hands of the Greeks, Jews, and Armenians. The Banians are employed in changing the coin current at Bassora, for that which is of higher value in India.

"The different commodities collected at Bassora are distributed into three channels. One half of them goes to Persia, whither they are conveyed by the caravans; there being no navigable river in the whole empire. The chief consumption is in the northern provinces, which have not been so much ravaged as those of the south. Both of them formerly made their payments in precious stones, which were become common by the plunder of India. They had afterwards recourse to copper utensils, which had been exceedingly multiplied from the great abundance of copper mines. At last they gave gold and silver in exchange, which had been concealed during a long scene of tyranny, and are continually dug out of the bowels of the earth. If they do not allow time for the trees that produce gum, and have been cut to make fresh shoots; if they neglect to multiply the breed of goats which afford such fine wool; and if the silks, which are hardly sufficient to supply the few manufactures remaining in Persia, continue to be so scarce; in a word, if this empire does not rise again from its ashes; the mines will be exhausted, and this source of commerce must be given up."

BASSO RELIEVO, or **BASS-RELIEF**; a piece of sculpture, where the figures or images do not protuberate, jet, or stand out, far above the plane on which they are formed.—Whatever figures or representations are thus cut, stamped, or otherwise wrought, so that not the entire body, but only part of it, is raised above the plane, are said to be done in *relief*, or *relievo*; and when that work is low, flat, and but little raised, it is called *low relief*. When a piece of sculpture, a coin, or a medal, has its figure raised so as to be well distinguished, it is called *bold*, and we say its *relief is strong*.

BASTARD, a natural child, or one begotten and

born out of lawful wedlock.

The civil and canon laws do not allow a child to remain a bastard, if the parents afterwards intermarry: and herein they differ most materially from our law; which, though not so strict as to require that the child shall be *begotten*, yet makes it an indispensable condition that it shall be *born*, after lawful wedlock. And the reason of our law is surely much superior to that of the Roman, if we consider the principal end and design of establishing the contract of marriage, taken in a civil light; abstractedly from any religious view, which has nothing to do with the legitimacy or illegitimacy of the children. The main end and design of marriage, therefore, being to ascertain and fix upon some certain person, to whom the care, the protection, the maintenance, and the education, of the children should belong; this end is undoubtedly better answered by legitimating all issue born after wedlock, than by legitimating all issue of the same parties, even born before wedlock, so as wedlock afterwards ensues: 1. Because of the very great uncertainty there will generally be, in the proof that the issue was really begotten by the same man; whereas, by confining the proof to the birth, and not to the begetting, our law has rendered it perfectly certain, what child is legitimate, and who is to take care of the child. 2. Because by the Roman law a child may be continued a bastard, or made legitimate, at the option of the father and mother, by a marriage *ex post facto*; thereby opening a door to many frauds and partialities, which by our law are prevented. 3. Because by those laws a man may remain a bastard till 40 years of age, and then become legitimate by the subsequent marriage of his parents; whereby the main end of marriage; the protection of infants, is totally frustrated. 4. Because this rule of the Roman law admits of no limitation as to the time, or number, of bastards to be so legitimated; but a dozen of them may, 20 years after their birth, by the subsequent marriage of their parents, be admitted to all the privileges of legitimate children. This is plainly a great discouragement to the matrimonial state; to which one main inducement is usually not only the desire of having children, but also the desire of procreating lawful heirs. Whereas our constitutions guard against this indecency, and at the same time give sufficient allowance to the frailties of human nature. For, if a child be begotten while the parents are single, and they will endeavour to make an early reparation for the offence, by marrying within a few months after, our law is so indulgent as not to bastardize the child, if it be born, though not begotten, in lawful wedlock; for this is an incident that can happen but once; since all future children will be begotten, as well as born, within the rules of honour and civil society.

From what has been said it appears, that all children born before matrimony are bastards by our law; and so it is of all children born so long after the death of the husband, that, by the usual course of gestation, they could not be begotten by him. But, this being a matter of some uncertainty, the law is not exact as to a few days. But if a man dies, and his widow soon after marries again, and a child is born within such a time as that by the course of nature it might have been the child of either husband; in this case, he is said to be more than ordinarily legitimate; for he may, when he

arrives

Bastard

Blackstone's
Commentaries

arrives to years of discretion, choose which of the fathers he pleases. To prevent this, among other inconveniences, the civil law ordained that no widow should marry *infra annum luctus*; a rule which obtained so early as the reign of Augustus, if not of Romulus: and the same constitution was probably handed down to our early ancestors from the Romans, during their stay in this island; for we find it established under the Saxon and Danish governments.

As bastards may be born before the coverture or marriage-state is begun, or after it is determined, so also children born during wedlock may in some circumstances be bastards. As if the husband be out of the kingdom of England (or, as the law loosely phrases it, *extra quatuor maria*) for above nine months, so that no access to his wife can be presumed, her issue during that period shall be bastards. But, generally, during the coverture, access of the husband shall be presumed, unless the contrary shall be shewn; which is such a negative as can only be proved by shewing him to be elsewhere: for the general rule is, *presumitur pro legitimatione*. In a divorce *a mensa et thero*, if the wife breeds children, they are bastards; for the law will presume the husband and wife conformable to the sentence of separation, unless access be proved: but, in a voluntary separation by agreement, the law will suppose access, unless the negative be shewn. So also, if there is an apparent impossibility of procreation on the part of the husband, as if he be only 8 years old, or the like, there the issue of the wife shall be bastard. Likewise, in case of divorce in the spiritual court *a vinculo matrimonii*, all the issue born during the coverture are bastards; because such divorce is always upon some cause that rendered the marriage unlawful and null from the beginning.

As to the duty of parents to their bastard children, by our law; it is principally that of maintenance. For, though bastards are not looked upon as children to any civil purposes; yet the ties of nature, of which maintenance is one, are not so easily dissolved: and they hold indeed as to many other intentions; as, particularly, that a man shall not marry his bastard sister or daughter. The method in which the English law provides maintenance for them is as follows. When a woman is delivered, or declares herself with child, of a bastard, and will by oath before a justice of the peace charge any person having got her with child, the justice shall cause such person to be apprehended, and commit him till he gives security, either to maintain the child, or appear at the next quarter-sessions to dispute and try the fact. But if the woman dies, or is married, before delivery, or miscarries, or proves not to have been with child, the person shall be discharged: otherwise the sessions, or two justices out of sessions, upon original application to them, may take order for the keeping of the bastard, by charging the mother or the reputed father with the payment of money or other sustentation for that purpose. And if such putative father, or lewd mother, run away from the parish, the overseers by direction of two justices may seize their rent goods, and chattels, in order to bring up the said bastard child. Yet such is the humanity of our laws, that no woman can be compulsively questioned concerning the father of her child, till one month after her delivery: which indulgence is however very frequently a hardship upon parishes, by giving the parents opportunity to escape.

As to the *rights and incapacities*; which appertain to a bastard: The former are very few, being only such as he can acquire; for he can inherit nothing, being looked upon as the son of nobody, and sometimes called *filius nullius*, sometimes *filius populi*. Yet he may gain a surname by reputation, though he has none by inheritance. All other children have their primary settlement in their father's parish; but a bastard in the parish where born, for he hath no father. However, in case of fraud, as if a woman either be sent by order of justices, or comes to beg as a vagrant, to a parish which she does not belong to, and drops her bastard there; the bastard shall, in the first case, be settled in the parish from whence she was illegally removed; or, in the latter case, in the mother's own parish, if the mother be apprehended for her vagrancy. Bastards also, born in any licensed hospital for pregnant women, are settled in the parishes to which the mothers belong.—The *incapacity* of a bastard consists principally in this, that he cannot be heir to any one; for, being *nullius filius*, he is therefore of kin to nobody, and has no ancestor from whom any inheritable blood can be derived: Therefore, if there be no other claimant upon an inheritance than such illegitimate child, it shall escheat to the lord. And as bastards cannot be heirs themselves, so neither can they have any heirs but those of their own bodies. For as all collateral kindred consists in being derived from the same common ancestor, and as a bastard has no legal ancestors, he can have no collateral kindred; and, consequently, can have no legal heirs, but such as claim by a lineal descent from himself. And therefore, if a bastard purchases land, and dies seized thereof without issue, and intestate, the land shall escheat to the lord of the fee. A bastard was also, in strictness, incapable of holy orders; and, though that were dispensed with, yet he was utterly disqualified from holding any dignity in the church: but this doctrine seems now obsolete; and, in all other respects, there is no distinction between a bastard and another man. And really any other distinction, but that of not inheriting, which civil policy renders necessary, would, with regard to the innocent offspring of his parent's crimes, be odious, unjust, and cruel to the last degree; and yet the civil law, so boasted of for its equitable decisions, made bastards in some cases incapable even of a gift from their parents. A bastard may, lastly, be made legitimate, and capable of inheriting, by the transcendent power of an act of parliament, and not otherwise: as was done in the case of John of Gaunt's bastard children, by a statute of Richard II.

As to the *punishment* for having bastard children: By the statute 18 Eliz. c. 3. two justices may take order for the punishment of the mother and reputed father: but what that punishment shall be, is not therein ascertained; though the coteremporary exposition was, that a corporal punishment was intended. By statute 7 Jac. I. c. 4. a specific punishment (*viz.* commitment to the house of correction) is inflicted on the woman only. But, in both cases, it seems that the penalty can only be inflicted, if the bastard becomes chargeable to the parish; for otherwise the very maintenance of the child is considered as a degree of punishment. By the last mentioned statute the justices may commit the mother to the house of correction, there to be punished and set on work for one year; and, in case of a second offence,

Bastard,
Bastardy.
* Chamb.
Ditt.

offence, till the find sureties never to offend again.

He that gets a bastard in the hundred of Middleton in Kent, forfeits all his goods and chattels to the king*.

If a bastard be got under the umbrage of a certain oak in Knollwood in Staffordshire, belonging to the manor of Terley-castle, no punishment can be inflicted, nor can the lord nor the bishop take cognizance of it†.

It is enacted by statute 21 Jac. I. c. 27. that if any woman be delivered of a child, which if born alive should by law be a bastard; and endeavours privately to conceal its death, by burying the child or the like; the mother so offending shall suffer death, as in the case of murder, unless she can prove by one witness at least that the child was actually born dead. This law, which favours pretty strongly of severity, in making the concealment of the death almost conclusive evidence of the child's being murdered by the mother, is nevertheless to be also met with in the criminal codes of many other nations of Europe; as the Danes, the Swedes, and the French: but it has of late years been usual with us, upon trials for this offence, to require some sort of presumptive evidence that the child was born alive, before the other constrained presumption (that the child, whose death is concealed, was therefore killed by its parent) is admitted to convict the prisoner.

BASTARDS is also an appellation given to a kind of faction or troop of banditti, who rose in Guienne, about the beginning of the 14th century, and, joining with some English parties, ravaged the country, and set fire to the city of Xaintes. Mezeray supposes them to have consisted of the natural sons of the nobility of Guienne, who, being excluded the right of inheriting from their fathers, put themselves at the head of robbers and plunderers to maintain themselves.

* BASTARD Flower-fence. See ADENANTHERA.—The flowers of this plant bruised and steeped in breast-milk are a gentle anodyne; for which purpose they are often given in the West Indies to quiet very young children. The leaves are used instead of fena in Barbadoes and the Leeward Islands. In Jamaica, the plant is called fena.

BASTARD-Hemp. See DATISCA.

BASTARD-Rocket, Dyers-weed, or Wild Wood. See RESEDA.

BASTARD Star-of-Bethlehem. See ALBUCA.

BASTARDY is a defect of birth objected to one born out of wedlock. Eustathius will have bastards among the Greeks to have been in equal favour with legitimate children, as low as the Trojan war; but the course of antiquity seems against him. Potter and others shew, that there never was a time when bastardy was not in disgrace.

In the time of William the Conqueror, however, bastardy seems not to have implied any reproach, if we may judge from the circumstance of that monarch himself not scrupling to assume the appellation of bastard. His epistle to Alan count of Bretagne begins, *Ego*

Willihelmus cognomento bastardus.*

BASTARDY, in relation to its trial in law, is distinguished into general and special. General bastardy is a certificate from the bishop of the diocese, to the king's justices, after inquiry made, whether the party is a bastard or not, upon some question of inheritance. Bastardy special is a suit commenced in the king's courts,

against a person that calls another bastard.

Arms of BASTARDY should be crossed with a bar, fillet, or traverse, from the left to the right. They were not formerly allowed to carry the arms of their father, and therefore they invented arms for themselves; and this is still done by the natural sons of a king.

Right of BASTARDY, *Droit de bastardise*, in the French laws, is a right, in virtue whereof the effects of bastards dying intestate devolve to the king or the lord.

BASTARNICÆ ALPES, (anc. geog.), mountains extending between Poland, Hungary, and Transylvania, called also the *Carpatæ*, and now the *Carpathian* mountains.

BASTERIA, ALL-SPICE; a genus of plants not described by Linnæus, but to which Mr Miller has given the name of *Basteria* from Dr Job Baister F. R. S. a learned botanist of Holland. Of this there is only one species known, viz. with oval leaves placed opposite, flowers coming from the sides of the stalks, and a branched shrubby stalk. It is a native of Carolina in America. The flowers appear in May, are of a dull purple colour, and have a disagreeable scent. The bark is brown; and has a very strong aromatic flavour, from whence the plant takes its name of *All-spice*.

BASTI, (anc. geog.) a town of the province of Bætica in Spain, situated to the west of the Campus Spartarius. Now *Baza* in Granada. See BAZA.

BASTIA, a sea-port town of Albania in Turkey in Europe, over against the island of Corfu, at the mouth of the river Calamu. E. Long. 10. 35. N. Lat. 39. 40.

BASTIA, the capital of the island of Corsica in the Mediterranean. It has a good harbour; and is seated on the eastern part of the coast, in E. Long. 9. 42. N. Lat. 42. 35.

BASTILE, denotes a small antique castle, fortified with turrets. Such is the bastille of Paris, which seems the only castle that has retained the name: it was begun to be built in 1369 by order of Charles V. and was finished in 1383 under the reign of his successor.—Its chief use is for the custody of state-prisoners.

BASTIMENTOS, the name of some small islands near Terra Firma in South America, at the mouth of the bay of Nombre de Dios.

BASTION, in the modern fortification, a huge mass of earth, faced usually with sods, sometimes with brick, and rarely with stone, standing out from a rampart whereof it is a principal part, and is what, in the ancient fortification, was called a *bulwark*.

Solid BASTIONS, are those that have the void space within them filled up entirely, and raised of an equal height with the rampart.

Void and Hollow BASTIONS, are those that are only surrounded with a rampart and parapet, having the space within void and empty, where the ground is so low, that, if the rampart be taken, no retrenchment can be made in the centre, but what will lie under the fire of the besieged.

Flat BASTION, is a bastion built in the middle of the curtain, when it is too long to be defended by the bastion at its extremes.

Cut BASTION, is that whose point is cut off, and instead thereof has a re-entering angle, or an angle inwards, with two points outwards; and is used either when without such a contrivance the angle would be too

* Du Cange.
Gloss. Lat.
T. 1. p. 502.

too acute, or when water or some other impediment hinders the carrying on the bastion to its full extent.

Composed BASTION, is when two sides of the interior polygon are very unequal, which makes the gorges also unequal.

Deformed BASTION, is when the irregularity of the lines and angles makes the bastion out of shape; as when it wants one of its demigorges, one side of the interior polygon being too short.

Demi BASTION, is composed of one face only, and but one flank, and a demigorge.

Double BASTION, is that which is raised on the plane of another bastion.

Regular BASTION, is that which has its true proportion of faces, flanks, and gorges.

BASTION of France, a fortress on the coast of Barbary, belonging to the French *.

BASTITANI, (anc. geog.) a people of the province of Bætica in Spain. See *BÆTICA*.

BASTOIGNE, a small town of the Netherlands, in the duchy of Luxemburgh. E. Long. 6. o. N. Lat. 50. 10.

BASTON, in law, one of the servants to the warden of the Fleet-prison, who attended the king's courts with a red staff, for taking into custody such as are committed by the court. He also attends on such prisoners as are permitted to go at large by licence.

BASTON, or *Batoun*, in architecture, a moulding in the base of a column, called also a *torse* *.

BASTON, *Baton*, or *Batune*. This word is French, and signifies a staff or cudgel: it should be spelt *Bâton*; but is, by most English writers, corruptly spelt as above. It is only borne in English coats-of-arms, as a badge of illegitimacy; but French heralds introduce it in arms as a difference, or mark of consanguinity.

BASTON (Robert), a Carmelite monk, afterwards prior of the convent of that order at Scarborough, and also poet laureat and public orator at Oxford, flourished in the fourteenth century. King Edward I. in his expedition into Scotland in 1304, took Robert Baston with him, in order to celebrate his victories over the Scots; but our poet being taken prisoner, was obliged to change his note, and sing the successes of Robert Bruce. He wrote several books in Latin, on the Wars of Scotland, the Luxury of Priests, Synodical Sermons, &c.; and also a volume of tragedies and comedies, in English. He died about the year 1310.

BASTONADO, *BASTONADE*, the punishment of beating or drubbing a criminal with a stick. The word is formed of the French *baston*, a stick or staff. The bastonade is a punishment used both among the ancient Greeks, Romans, and Jews, and still obtains among the Turks. The Romans called it *fustigatio*, *fistium admotio*, or *fustibus cædi*; which differed from the *flagellatio*, as the former was done with a stick, the latter with a rod, or scourge. The fustigation was a lighter punishment, and inflicted on freemen; the flagellation a severer, and reserved for slaves. It was also called *tympaanum*, because the patient here was beat with sticks, like a drum.—The punishment is much in use in the east to this day. The method there practised is thus: the criminal being laid on his belly, his feet are raised, and tied to a stake, held fast by officers for the

purpose; in which posture he is beaten by a cudgel on the soles of his feet, back, chin, &c. to the number of 100 or more blows.

BASTWICK (Dr John), born at Writtle in Essex, in 1593; practised physic at Colchester; but being a man of warm imagination, and a good Latin scholar, applied himself to writing books against popery. About the year 1633, he printed in Holland a Latin treatise intitled, *Elenchus religionis Papificæ*, with *Flagellum pontificis et episcoporum Latianum*, in which the English Prelates thinking themselves also aimed at, he was fined £. 1000 in the high commission court, excommunicated, prohibited practising physic, his books ordered to be burnt, and himself to remain in prison until he made a recantation. Instead of recanting, he wrote in prison, *Apologeticus ad presules Anglicanos*; and another book called, *The Litany*; wherein he severely exclaimed against the proceedings of that court, and taxed the bishops with an inclination towards popery. Prynne and Burton coming under the lash of the star chamber-court at the same time, they were all censured as scandalous seditious persons, condemned to a fine of £. 5000 each, to be pilloried, to lose their ears, and to perpetual imprisonment in three remote parts of the kingdom. The parliament in 1640 reversed these proceedings; and ordered Dr Bastwick a reparation of £. 5000 out of the estates of the commissioners and lords who had prosecuted him, which the ensuing confusions prevented his receiving; however, his wife had, in 1644, an allowance ordered for her and her husband's maintenance. What became of him afterward, is not known.

BAT, in zoology. See *VESPERTILIO*.

BAT-Fowling, a method of catching birds in the night, by lighting some straw, or torches, near the place where they are at roost; for upon beating them up, they fly to the flame, where being amazed, they are easily caught in nets, or beat down with bushes fixed to the end of poles, &c.

BAT, *Bate*, or *Batz*, a small copper coin, mixed with a little silver, current in several cities of Germany: it is worth four cruzers. It is also a coin in Switzerland, current at five livres, or 100 sols, French money.

BATABLE GROUND, that land which lay between Scotland and England, when the kingdoms were distinct, to which both nations pretended a right.

BATACALA, a small kingdom on the coast of Malabar in the East Indies. It had a very large town of the same name; but there is nothing now left, except 11 or 12 small pagods covered with copper and stone. The country produces a good deal of pepper: the English formerly had a factory here; but were all massacred by the natives, because one of their bull-dogs had killed a consecrated cow.

BATACALA, a fortified town and castle on the east coast of the island of Ceylon in the East Indies. The Dutch drove away the Portuguese, and possessed themselves of part of the adjacent country. E. Long. 18. 3. N. Lat. 7. 55.

BATANISTS, or *BATENITES*. See *BATENITES*.

BATASEK, a town of lower Hungary, seated on the Danube, in E. Long. 19. 50. N. Lat. 46. 30.

BATAVA, (*Castra* understood), a citadel of Vin-delicia, so called from the Cohors Batava, in garrison under the commander in Rhetia; now *Passau*; being

Bastwick
||
Batava.

first

first called *Batau*, from the Batavi; then *Bassau*, and *Passau*; situated in Bavaria at the confluence of the Danube, Inn, and Ills. See *PASSAU*.

BATAVIA, the capital of the Dutch settlements in the East Indies; a city of the kingdom of Bantam in the island of Java. See *JAVA*.

BATAVORUM INSULA, the island of the Batavians, (anc. geog.) Of this island Tacitus gives the following description. "The Rhine flowing in one channel, or only broken by small islands, is divided at its entering Batavia, as it were into two rivers. One continues its course through Germany, retaining the same name, and violent current, till it falls into the ocean. The other washing the coast of Gaul, with a broader and more gentle stream, is called by the inhabitants *Vahalis*; which name it soon changes for that of *Mosa*, by the immense mouth of which river it discharges itself into the same ocean." According to Tacitus, therefore, the island of the Batavians was bounded by the ocean, the Rhine, and the *Vahalis*, now the *Wale*. Cæsar extends it to the *Mosa*, or *Menſes*; but Pliny agrees with Tacitus. However, this island was of greater extent in Tacitus's time than in Cæsar's; Drusus, the father of Germanicus, having by a new canal conveyed the waters of the Rhine into the ocean a considerable way north of the former mouth of that river. The Batavi were a branch of the Catti, who, in a domestic sedition, being expelled their country, occupied the extremity of the coast of Gaul, at that time uninhabited, together with this island situated among shoals. Their name *Batavi* they carried with them from Germany; there being some towns in the territory of the Catti called *Battenberg*, and *Battenhausen*. The bravery of the Batavi, especially the horse, procured them not only great honour from the Romans, being called their *brothers* and *friends*; but an exemption from taxes, being obliged only to furnish men and arms. The modern name of this island is *Betu*, or *Betaw*. See *BETUE* and *BATTÆ*.

BATCHELOR, or **BACHELOR**, an appellation given to a man not married, or who is yet in a state of celibacy. For the derivation of the word, see *BACHELOR*.—The Roman censors frequently imposed fines on old bachelors. Dion. Halicarnassensis mentions an old constitution, by which all persons of full age were obliged to marry. But the most celebrated law of this kind was that made under Augustus, called the *lex Julia de maritandis ordinibus*; by which bachelors were made incapable of legacies or inheritances by will, unless from their near relations. This brought many to marry, according to Plutarch's observation, not so much for the sake of raising heirs to their own estates, as to make themselves capable of inheriting those of other men.—The rabbins maintain, that, by the laws of Moses, every body, except some few particulars, is obliged in conscience to marry at 20 years of age: this makes one of their 613 precepts. Hence those maxims so frequent among their casuists, that he who does not take the necessary measures to leave heirs behind him, is not a man, but ought to be reputed a homicide. Lyeurgus was not more favourable: by his laws, bachelors are branded with infamy, excluded from all offices civil and military, and even from the Jews and public sports. At certain feasts they were forced to appear, to be exposed to the public derision, and led

round the market-place. At one of their feasts, the women led them in this condition to the altars, where they obliged them to make *amende honorable* to nature, accompanied with a number of blows, and lashes with a rod at discretion. To complete the affront, they forced them to sing certain songs composed in their own derision.—The Christian religion is more indulgent to the batchelor state: the ancient church recommended it as preferable to, and more perfect than, the matrimonial. In the canon law, we find injunctions on batchelors, when arrived at puberty, either to marry, or to turn monks and profess chastity in earnest.—In England, there was a tax on batchelors, after 25 years of age, 12 l. 10 s. for a duke, a common person 1 s. by 7 Will. III. 1695.

BATCHELORS, in an university sense. See *BACHELOR*.

BATCHELORS, in the livery company of London, are those not yet admitted to the livery. Every company of the 12 consists of a master; two wardens; the livery; and the batchelors, who are yet but in expectation of dignity in the company, and have their function only in attendance on the master and wardens.

Knight-BACHELOR, the most ancient, but the lowest order of knights in England; known by the name of *knights* only. They are styled *knights-bachelors*, because this title does not descend to their posterity.—

The custom of the ancient Germans was to give their young men a shield and a lance in the great council: this was equivalent to the *toga virilis* of the Romans: before this, they were not permitted to bear arms, but were accounted as part of the father's household; after it, as part of the public. Hence some derive the usage of knighting, which has prevailed all over the western world, since its reduction by colonies, from those northern heroes. Knights are called in Latin *equites aurati*: *aurati*, from the gilt spurs they wore; and *equites*, because they always served on horseback: for it is observable, that almost all nations call their knights by some appellation derived from an horse. They are also called in our law *milites*, because they formed a part, or indeed the whole, of the royal army, in virtue of their feudal tenures; one condition of which was, that every one who held a knight's fee (which in Henry the second's time amounted to 20 l. *per annum*) was obliged to be knighted, and attend the king in his wars, or pay a fine for his non-compliance. The exertion of this prerogative, as an expedient to raise money in the reign of Charles I. gave great offence, though warranted by law and the recent example of queen Elizabeth: but it was, at the Restoration, together with all other military branches of the feudal law, abolished; and this kind of knighthood has, since that time, fallen into disregard. It is conferred indiscriminately upon gowndmen, burghers, and physicians, by the king's lightly touching the person, who is then kneeling, on the right shoulder with a drawn sword, and saying, *Rise Sir*. See the articles *KNIGHT* and *NOBILITY*.

BATE (George), an eminent physician, born at Maid's Morton, near Buckingham, in the year 1608. In 1629 he obtained a licence, and for some years practised in and about Oxford: his practice was chiefly amongst the puritans, who at that time considered him as one of their party. In 1637, he took his degree

of doctor in physic, and became very eminent in his profession, so that when king Charles kept his court at Oxford, he was his principal physician. When the king's affairs declined, Dr Bate removed to London, where he accommodated himself so well to the times, that he became physician to the Charter-house, fellow of the college of physicians, and afterwards principal physician to Oliver Cromwell. Upon the restoration, he got into favour with the royal party, was made principal physician to the king, and fellow of the Royal Society; and this, we are told, was owing to a report raised on purpose by his friends, according to Mr Wood, that he gave the protector a dose which hastened his death. Dr Bate wrote in Latin an account of the late commotions in England, and some other pieces. He died at his house in Hatton-garden, and was buried at Kington upon Thames in Surry.—There was another George Bate, who wrote a work entitled “The Lives, Actions, and Execution, of the prime Actors and principal Contrivers of that horrid Murder of our late pious and sacred king Charles I.”

BATENITES, a sect of apostates from Mahometanism dispersed through the East, who professed the same abominable practices with the Ismaelians and Karmatians. The word properly signifies *esoteric*, or people of inward or hidden light.

BATES (William), D. D. an eminent Presbyterian divine, born in November 1625. He was admitted in Emanuel college, Cambridge, and from thence removed to King's college in 1644. He was one of the commissioners, at the conference in the Savoy, for reviewing the public liturgy, and was concerned in drawing up the exceptions against the Common Prayer: however, soon after the restoration, he was appointed chaplain to king Charles II. and became minister of St Dunstan's in the west, but was deprived of that benefice for nonconformity. Dr Bates bore a good and amiable character; and was honoured with the friendship of the lord keeper Bridgman, the lord chancellor Finch, the earl of Nottingham, and archbishop Tillotson. He was offered, at the restoration, the deanery of Litchfield; which he refused. He published *Select Lives of illustrious and pious persons*, in Latin; and since his death all his works, except his *Select Lives*, have been printed in one volume in folio. He died in July 14. 1699, in the 74th year of his age.

BATH, a city of Somersetshire in England, seated in W. Long. 2. 30. N. Lat. 51. 27. All the different names that this city has borne in different ages and languages have been taken from its medicinal waters, as the *Uvula Trigua*, or “hot waters,” of Ptolemy; the *aque solis*, or “waters of the sun,” of Antoninus; the *Caer Baden*, and *Caer Ennant*, i. e. “the city of baths,” and “the city of ointment,” of the Britons; and the *Ack-manchaster*, i. e. “the city of valetudinarians,” of the Saxons. The baths consist of the King's-bath, the Queen's-bath, the Cross-bath, the Hot-bath, the Leper's-bath, and the duke of Kingston's-bath. This place was of old a resort only for cripples and diseased persons; but now it is more frequented by the sound for pleasure, than by the sick for health. The waters are very pleasant to the taste; and impregnated with a vitriolic principle, yielding, upon evaporation, a little neutral salt, and a calcareous earth and iron. They are very efficacious in strengthening the bowels and

stomach, bracing the relaxed fibres, and invigorating the circulation. In bilious complaints they are counted specific; and prove serviceable in most nervous, paralytic, rheumatic, and gouty complaints. At the King's-bath is a handsome pump-room, where the gentlemen and ladies go in a morning to drink the waters; and there is a band of music that plays all the time. In the Cross-bath is a monument of marble, representing the descent of the Holy Ghost attended by angels, erected by the earl of Melfort (who was secretary of state for Scotland) when king James II. met his queen here. The King's-bath is a large basin of 65 feet 10 inches by 40 feet 10 inches, containing 346 tons 2 hogheads and 36 gallons of water when filled to its usual height. In the middle is a wooden building with niches and seats for the accommodation of the bathers. There are also iron rings all round for them to hold by; and guides, both male and female, to attend them in the bath. The person intending to bathe puts on, at his own lodgings, a bathing dress of brown canvas hired for the purpose; and is carried in a clove chair, of a particular make, to one of the slips which open into the bath. There he descends by steps into the water, where he is attended by a guide. Having staid his staid time in the bath, he ascends again into the slip, where he puts off his bathing-dress, and being wrapt up in blankets, is carried home to bed, where he lies for some time to encourage perspiration. The King's-bath is overlooked by the company in the pump-room; and adjoining to it are places furnished with pumps to pour the hot streams on any particular part of the body. The Queen's-bath communicates with the King's, from which it is filled; therefore the water of it is not so hot, being at a greater distance from the source. As the heat is here more moderate, the bathers descend first into the Queen's-bath, and advance gradually to the centre of the other. In the year 1755, the abbey-house, or priory, belonging to the duke of Kingston, was taken down, in order to erect a more commodious pile of building; and in digging for the foundation, the workmen discovered, about twenty feet below the surface of the earth, the remains of Roman baths and sudatories constructed upon an elegant plan, with floors suspended on pillars, and surrounded with tubulated bricks, for the conveyance of heat and vapour. These were supplied by a spring of hot water, of the same properties and temperature with those of the King's-bath; and the sewer was found still entire, that conveyed the waste water into the river. The duke, having cleared the spring and the sewer, has erected several convenient baths and sudatories on the spot, where invalids may be accommodated at all hours, by night as well as by day. The two seasons are the spring and fall; but those who take the waters purely for their health do not regard the seasons, but drink them all the year round. There are a number of genteel sedan chairs, which carry people to any distance, not exceeding half a mile, for sixpence. The company assemble in the afternoon, alternately, at two stately rooms, to converse together, or play at cards. At a very pretty new theatre near the parades, plays are acted every other night; and there are balls twice a-week, for which and the rooms, and books at the libraries, the gentry generally subscribe. The city is surrounded with hills on all sides, except a little open-

Bath.

ing to the east and west, through which the Avon runs. This river, which has been made navigable to Bristol by act of parliament, washes the city on the east and south sides, and there is an elegant bridge over it. This city hath formerly had a slight wall, of which some part still remains, as well as one or two of its gates; but almost all the new buildings, and much the greatest and finest part of the city, is without the walls, particularly the fine square called *Queen's-square*, in the middle of which is a small garden, with gravel walks, and an obelisk in the centre. But the greatest ornament at Bath is the circus: it is of a circular form, consisting of houses built on an uniform plan, with three openings at equal distances to the south, east, and west, leading into as many streets. The fronts of the houses, which are all three stories high, are adorned with three rows of columns in pairs, of the Doric, Ionic, and Corinthian orders, the frieze embellished with sculpture. The whole has an air of magnificence, which cannot fail to strike the most indifferent spectator. In the centre of the area is a reservoir, or basin, filled by two or three springs rising in the neighbouring hills; whence the fountains in this district are supplied with water. On the south side of the town are the north and south parades, two noble walks, paved with hewn stone, raised upon arches, facing each an elegant row of houses on one side, and having a stone balustrade on the other. These, with the two streets that join them, were planned and executed by one Mr Wood, an able architect, who likewise built the square, and projected the circus. The two public rooms stand betwixt the north parade and Orangegrove; which last is a square planted with trees, having in the middle a stone obelisk, inscribed in Latin to the late prince of Orange, who recovered his health in consequence of drinking the Bath waters, and gave his name to this part of the town. Several new streets and rows have of late years been built on the north-side of Bath, in the neighbourhood of the square, such as Gay-street, Milsom-street, Edgar-row, Harlequin-row, Bladud's-buildings, King's-mead-street, and Brock-street. Their advantages for building here are very great, having excellent free-stone, limestone, and slate, in the neighbourhood. One sort of their lime is as white as snow. The guild-hall of Bath stands in the market-place, and is said to be built on a plan of Inigo Jones, which, however, exhibits nothing worthy of that great architect: besides, one end of it has been rebuilt in a different stile. The hall is ornamented with some portraits of the late prince of Wales and other remarkable personages: but the greatest curiosity of the place is a Minerva's head in bronze, a real antique, dug up in Stall-street, in the year 1725. Bath boasts a noble infirmary, or general hospital, for the reception of the sick and lame from all parts of the three kingdoms. It extends 100 feet in front, and 90 in depth, being capable of receiving 150 patients. Here was anciently a monastery, of which the present cathedral was the church. It is a venerable pile; the principal front of which is adorned with angels ascending and descending. The bishop of the diocese is nominated both from Bath and Wells; yet he and his chapter always reside at Wells. There are three other churches in Bath, and several chapels and meeting-houses. Besides the infirmary, there are several other hospitals,

alms-houses, and charity-schools. The corporation consists of a mayor; eight aldermen, of whom two are justices of the peace; and 24 common-council men. The city is extremely well provided with stage-coaches, post-coaches, chaises, machines, and waggons. Bath is the general hospital of the nation, and a great number of invalids find benefit from the waters: but as the city lies in a bottom surrounded by very high hills, the air is constantly furcharged with damps; and indeed this place is more subject to rain than any other part in England. The markets are remarkably well supplied with provisions of all kinds at reasonable rates, particularly fish and poultry. They also afford excellent mutton fed upon Lansdown, one of the highest hills that overlook the city. This down, remarkable for its pure air, extends about three miles; and at the extremity of it there is a stone monument, with an inscription, erected to the memory of Sir Bevil Granville, who was here killed in a battle which he fought with the parliament's army in the reign of Charles I.

BATH, in medicæ, chemistry, &c. signifies a quantity of matter either moist or dry, included in a proper vessel, and sufficient for the total immersion of the human body, or any other substance which it may be judged necessary to cover with it. Hence baths are divided into moist and dry, according as the materials are either aqueous or not: the first are subdivided into hot and cold; and these are either natural or artificial. The natural hot baths are formed of the water of hot springs, of which there are many in different parts of the world; especially in those countries where there are or have evidently been volcanoes. The artificial hot baths consist either of water, or of some other fluid made hot by art. Sometimes indeed the vapour of water, either naturally or artificially heated, is made use of without suffering the person to enter the water itself; this is called the *vapour-bath*, and is a powerful sudorific. The cold bath consists only of water, either fresh or salt, in its natural degree of heat; or it may be made colder by art, as by a mixture of nitre, sal-ammoniac, &c.

Bathing seems to have been a very ancient practice. The Greeks, as early as the heroic age, are said to have bathed themselves in the sea, in rivers, &c. We even find mention in Homer of hot-baths in the time of the Trojan war; but these seem to have been very rare, and used only upon extraordinary occasions. Athenæus speaks of them as unusual even in his time. In reality, public baths seem to have been for some time discouraged if not prohibited by the Greeks, who were contented to wash themselves at home in a sort of bathing tubs. The method of bathing among them was by heating water in a large vessel with three feet, and thence pouring it on the head and shoulders of a person seated in a tub for that purpose, who at coming out was anointed with oil. The Greek baths consisted of seven different apartments, usually separated from one another, and intermixed with other buildings belonging to different kinds of exercises. These were, 1. The cold bath, *frigida lavatio*; in Greek λυτρον. 2. The *eleuthesium*, or room where they were anointed with oil. 3. The *frigidarium*, or cooling room. 4. The *propnegeum*, or entrance of the *hypocaustum* or stove. 5. The vaulted room for sweating in, or vapour-bath, called by the Romans *concamerata fudatio*. 6. The

16. *laconicum*, or dry stove; and 7. The hot bath, called *calida lavatio*.

The Greek baths were usually annexed to *palestra* or *gymnasia*, of which they were considered as a part. They appear to have been double, one for men, and the other for women; but so near, that one furnace served for heating both. The middle part was possessed by a large basin, which received water by several pipes, and into which they went down by steps, being surrounded by a ballustrade, behind which was a kind of corridor, which formed a pretty large area to hold those who were waiting till there should be room for them in the bath. They were vaulted over, and only received light from the top.

The Romans were also long before they came into the use of baths; the very name of which, *thermae*, shews they borrowed the practice from the Greeks.—As the ancient Romans were chiefly employed in agriculture, their custom was, every evening after work, to wash their arms and legs, that they might sit down to supper with more decency; for it is to be observed, that the use of linen was then unknown, in Italy at least; and the people of that age went with their legs and arms bare, and consequently exposed to dust and filth. But this was not all; for, every ninth day, when they repaired to the *nundinae*, or to the assemblies of the people, they bathed all over in the Tiber, or some river that happened to be nearest to them. This seems to have been all the bathing used till the time of Pompey, when the custom began of bathing every day.—The Romans, when they found their stomachs overcharged with meat, went to the bath, as we learn from Juvenal, who inveighs against those that, having gorged themselves with eating, were forced to go into the bath to give themselves relief. They also found that a bath was good for refreshing them after some considerable fatigue, as we are informed by Celsus the physician. Hence, after Pompey's time, when luxury was prodigiously increased, the humour of bathing was carried to an extravagant height. Many by the immoderate use of the bath entirely ruined their constitution, being unable to taste food without bathing first. By this practice the emperor Titus is said to have lost his life. Hence Pliny inveighs severely against those physicians who held that hot baths digested the food. The emperor Adrian first laid a restraint on this immoderate humour of bathing, forbidding all persons to go to the bath before the eighth hour.

According to Dion, Mæcenas was the first who made a bath at Rome: yet there are instances of public baths before his time; but they were of cold water, small, and poorly decorated. Agrippa in his ædile built a bath of 160 paces in length, where the citizens might be accommodated with either the hot or cold bath *gratis*. After his example Nero, Vespasian, Titus, Domitian, Severus, Gordian, Aurelian, Maximian, Dioclesian, and most other emperors who studied to gain the affections of the people, erected baths laid with the finest marble, and built according to the nicest rules of architecture. Alexander Severus was the first who allowed the public baths to be open during the night in the heats of summer.

In the Roman baths, the first part that appeared was a large basin called *natatio* and *piscina*. The middle was possessed by the *hypocaustum*, which had a string

of four apartments on each side called *balnearia*, so contrived, that one might easily go out of one into the other. There were two stoves called *laconicum* and *tepidarium*, which were joined together and built circular. Their floor was hollow and suspended, to receive the heat of the *hypocaustum*, which was a large furnace underneath. The same furnace also heated another room called *vasarium*, situated near the stoves, wherein were placed three large brazen vessels called *millaria* on account of their capacity; one for hot water, another for warm water, and a third for cold water; being so contrived, that the water might pass from one to the other by means of several siphons, and be distributed by pipes and cocks into the neighbouring bath, as occasion required. The rich had baths at home, and frequently very magnificent ones; but they used them only upon extraordinary occasions: the great men, and even emperors themselves, sometimes bathed in public with the rest of the people. At three in the afternoon, which is what Pliny calls *hora octava et nona*, the Romans all repaired to the baths, either the public or private ones; the public baths were all opened at the found of a bell, and always at the same hour.

The baths of Agrippa were built of brick, but painted in enamel; those of Nero were not only furnished with fresh water, but also had the sea water brought into them; those of Caracalla were adorned with 200 marble columns, and furnished with 1600 seats of the same matter. Liplius assures us they were so large, that 1800 persons might conveniently bathe in them at once. But the baths of Dioclesian surpassed all the rest in magnificence; 140,000 persons were employed for many years in building them. Great part of these, as well as of the baths of Caracalla, are still standing; and with the vast high arches, the beautiful and stately pillars, &c. make one of the greatest curiosities in modern Rome.

The Celtic nations were not without the use of bathing: the ancient Germans bathed every day in warm water in winter, and in summer in cold. In England, the famous bath in Somersetshire is said by some to have been in use 800 years before Christ. Of this, however, it must be owned we have but very slender evidence: but Dr Musgrave makes it probable that it was a place of considerable resort in Geta's time; there being still the remains of a statue erected to that general, in gratitude for some benefactions he had conferred upon it.

Cold bathing was in high esteem among the ancient physicians for the cure of diseases, as appears from Strabo, Pliny, Hippocrates, and Oribasius; whence frequent exhortations to washing in the sea, and plunging into cold water. The first instance of cold bathing, as a medicine, is Melampus's bathing the daughters of the king of Argos; and the first instance of warm bathing is Medea's use of it, who was said to boil people alive, because Pelias king of Thessaly died in a warm bath under her hands. The cold bath was used with success by Antonius Musa, physician to the emperor Augustus, for the recovery of that prince; but fell into neglect after the death of Marcellus, who was thought to have been destroyed by the improper use of it. It was again brought into request, towards the close of the reign of Nero, by means of a physician of Marseilles named *Gharmis*; but during the ig-

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* See the
Index sub-
joined to
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norance of the succeeding ages, the practice was again banished for a long time. Both hot and cold bathing are now prescribed in many cases by the physicians, though they are not agreed as to the manner in which they operate on the human body *.

As to the origin of those hot waters, of which the natural hot baths are formed, we are very much in the dark. All we can affirm with certainty is, that where there are volcanoes, there also there are hot springs in great abundance; but how the heat of the volcano should be constantly communicated to the waters of a spring for many ages, during a great part of which the volcano itself has lain in a dormant state, seems almost beyond the reach of investigation. Another thing that creates a great difficulty is, that the fire of a volcano must certainly lie very deep in the earth, and most probably shifts from place to place, but the waters of a spring must always issue from a place situated lower than the origin of the spring itself. Besides, though we should suppose the water to come from the top of a volcano itself, and consequently boiling hot, it could not be supposed to percolate far through cold earth without losing all the heat it acquired from the volcano. From some observations, however, it certainly does appear, that there are some spots on the earth that have a power of producing heat within themselves, independent of any thing foreign; and that water is so far from being able to destroy this power, that it seems rather to promote and continue it. We know that water hath this effect upon a mixture of iron filings and sulphur; but whatever quantities of similar substances we may suppose to be contained in the earth, we must also suppose to be destroyed by one great conflagration soon after they have begun to act upon each other, so that by their means no lasting heat in waters could be produced. Dr Stukely indeed would solve this, and several other phenomena, by making the fire and smoke of volcanoes the effects of electricity: but here sufficient proof is wanting; for electricity, even in its most powerful state, is not very apt to set bodies on fire. The thought, however, deserves attention; for if electricity is capable of setting a volcano on fire, it is undoubtedly capable of producing solfaterras where it meets with proper materials, and from them springs of any degree of heat *.

* See the
articles Sol-
faterra and
Volcano.

BATH, in Hebrew antiquity, a measure of capacity, containing the tenth part of an omor, or seven gallons and four pints, as a measure for things liquid; or three pecks and three pints, as a measure for things dry.

Knights of the BATH. See the article KNIGHT.

BATH-KOL, the daughter of a voice. So the Jews call one of their oracles, which is frequently mentioned in their books, especially the Talmud; being a fantastical way of divination invented by the Jews themselves, though called by them a revelation from God's will, which he made to his chosen people, after all verbal prophecies had ceased in Israel. It was in fact a method of divination similar to the *sortes Virgilianae* of the Heathens. For as, with them, the first words they happened to dip into, in the works of that poet, were a kind of oracle, whereby they predicted future events; so, with the Jews, when they appealed to Bath-kol, the first words they heard from any one's mouth were looked upon as a voice from heaven, directing them in the matter they inquired about. The Christians were not

quite free from this superstition, making the same use of the book of the Scriptures, as the Pagans did of the works of Virgil. It was practised by Heraclius, emperor of the east, in the beginning of the seventh century: for, being at war with Chosroes king of Persia, and in doubt, after a successful campaign, where to take up his winter-quarters, he consulted the book of the Scriptures in this way of divination, and was determined thereby. In France, it was the practice, for several ages, to use this kind of divination at the consecration of a bishop, in order to discover his life, manners, and future behaviour. This usage came into England with the Norman conquest; for we are told, that, at the consecration of William the second Norman bishop of the diocese of Norwich, the words which first occurred, on dipping into the Bible, were, *Not this man, but Barabbas*: soon after which, William died, and Herbert de Lozinga, chief Simony-broker to King William Rufus, succeeded him; at whose consecration, the words, at which the Bible opened, were the same which Jesus spoke to Judas the traitor; *Friend, wherefore art thou come?* This circumstance so affected Herbert, that it brought him to a thorough repentance of his crime; in expiation of which he built the cathedral church of Norwich, the first stone of which he laid in the year 1096.

BATHA, BATH, or *Bactia*, a town of Hungary, and capital of a county of the same name, seated on the Danube. E. Long. 20. 40. N. Lat. 46. 40.

BATHURST (Ralph), M. D. an eminent physician, poet, and divine, born in the year 1620. He studied divinity in Trinity college, Oxford; but the times of confusion coming on, he changed the course of his studies, and applied himself to physic. He took a doctor's degree in that faculty; in which he rose to such eminence, that he was, in the time of the usurpation, appointed physician to the state. Upon the restoration, he quitted his profession of physic; was elected a fellow of the Royal Society, and president of his college; and having entered into holy orders, he was made chaplain to the king, and afterwards dean of Wells. Soon after, he served the office of vice-chancellor of Oxford, and was nominated by King William and Queen Mary to the see of Bristol; which he refused to accept. His learning and talents were various. He was an orator, a philosopher, and a poet: he possessed an inexhaustible fund of wit, and was a facetious companion at 80 years of age. Ridicule was the weapon with which he used to correct the delinquents of his college; and he was so absolute a master of it, that he had it always at hand. His poetical pieces in the *Musa Anglicana* are excellent in their kind. He wrote several poems, both in English and Latin; and died June 14. 1704, in the 84th year of his age.

BATHURST (Allen), earl of Bathurst, one of the last worthies of Queen Anne's reign, that shining period of triumphs, taste, genius, and elegance, was born in the year 1684. His studies and his education were equally conducive to the brilliant figure he was destined to make in social life and in the senate, as a polite scholar, a patriot, and a statesman. These talents he had an opportunity to display as early as the year 1705; when, at the request of his father Sir Benjamin Bathurst, and the solicitation of the constituents of Cirencester, he served in parliament for that borough, his native

native soil, with reputation and integrity. He distinguished himself particularly in the struggles and debates relative to the union between the two kingdoms, firmly supporting this measure, calculated to strengthen the vigour of government by uniting its force. Though he was contented to act a subordinated character in the great opposition planned by Mr Harley and Mr St John, his intimate friends, to sap the credit of the duke of Marlborough and his adherents, he was of infinite service to his party in arraigning, with spirit and eloquence, the conduct of the general and the earl of Godolphin, who had long governed the Queen, and lavished the treasures of the nation on conquests more splendid than servicable. The loss of the battle of Almanza seconded his efforts to dispel the intoxication of former successes. His personal regard for Lord Somers, president of the council, was never altered, though they were of different opinions in politics; and when he was divested of his office, Mr Bathurst acted with such tenderness and delicacy, as to preserve the esteem of Lord Somers in a private station. In consideration of his zeal and services, the Queen advanced him, in 1711, to the dignity of a peer, by the title of Baron Bathurst, of Battlefield, in Bedfordshire.

His Lordship continued to speak his sentiments with an undaunted freedom in the upper house; and stepped forth as a formidable opponent to the court-measures in the reign of George I. and during Sir Robert Walpole's administration. The acrimony of the prosecution carried on against the Earl of Oxford, Lord Bolingbroke, and the Duke of Ormond, stimulated his indignation and his eloquence against such vindictive proceedings; and he observed, "that the king of a faction was but the sovereign of half his subjects."

The south-sea scheme having infected the whole nation with a spirit of avaricious enterprize, the people awaked from their delirium, and an infinite number of families was involved in ruin. Lord Bathurst publicly impeached the directors, whose arts had enabled them by these vain expectations to amass surprising fortunes: he represented that the national honour was concerned in stripping them of their ill-acquired wealth; and moved for having all the directors of the south-sea company punished by a forfeiture of their estates, for such a notorious act of sordid knavery.

When the bill was brought into the House of Lords against Dr Atterbury bishop of Rochester, that learned prelate, who joined to the graces of style and elocution all the elegance of a just delivery; among the many friends the bishop's eloquence, politeness, and ingenuity had procured him, was Lord Bathurst. He spoke against the bill with great vehemence and propriety; observing, "that if such extraordinary proceedings were countenanced, he saw nothing remaining for him and others to do, but to retire to their country-houses, and there, if possible, quietly enjoy their estates within their own families, since the least correspondence, or intercepted letter, might be made criminal." Then turning to the bishops, he said, he "could hardly account for the inveterate hatred and malice some persons bore the ingenious bishop of Rochester, unless it was that they were infatuated like the wild Americans, who fondly believe they inherit not only the spoils, but even the abilities, of the man they destroy." He was one of the Lords who entered his pro-

test against the bill.

His Lordship was entirely averse to continental connexions; and animadverted severely upon the monarch whose thoughts were turned to foreign concerns and alliances which could never be useful; complaining of the immense sums lavished in subsidies to needy and rapacious princes.

The directors of the charitable corporation having embezzled 500,000 l. of the proprietors capital, Lord Bathurst declared, in the House of Lords, his abhorrence of this most iniquitous scene of fraud; asserting, that not one shilling of the money was ever applied to the proper service, but became the reward of avarice and venality.

His Lordship concurred, with all his power, in the opposition to Sir Robert Walpole, who now tottered on the brink of ruin. This minister, after obstinate struggles, having been forced to resign all his employments, Lord Bathurst was sworn of the privy-council, and made captain of the gentlemen-pensioners, which post he resigned in 1744. He was appointed treasurer to the present king, then Prince of Wales, in 1757, and continued in the list of privy-counsellors at his accession to the throne; but, on account of his great age, he chose to enjoy *otium cum dignitate*.

Lord Bathurst's integrity gained him the esteem even of his opponents; and his humanity and benevolence, the affection of all that knew him more intimately. He added to his public virtues all the good breeding, politeness, and elegance, of social intercourse. Dr Freind, Congreve, Vanbrugh, Swift, Prior, Rowe, Addison, Pope, Arbuthnot, Gay, and most men of genius in his own time, cultivated his friendship, and were proud of his correspondence.

Pope, in his Epistle to him on the Ufe of Riches, thus addresses him:

The sense to value riches, with the art
To enjoy them, and the virtue to impart;
To balance fortune by a just expence,
Join with economy magnificence,
With splendor, charity, with plenty, health;
O teach us, Bathurst, yet unspoil'd by wealth!
'That secret rare, between th' extremes to move,
Of mad good nature, and of mean self-love.

And Sterne, in his Letters to Eliza, thus speaks of him:

"This nobleman (says he) is an old friend of mine: he was always the protector of men of wit and genius; and has had those of the last century always at his table. The manner in which his notice began of me, was as singular as it was polite.—He came up to me one day, as I was at the Princess of Wales's court, 'I want to know you, Mr Sterne; but it is fit you should know also who it is that wishes this pleasure: you have heard (continued he) of an old Lord Bathurst, of whom your Pops and Swifts have sung and spoken so much: I have lived my life with geniuses of that cast, but have survived them; and despairing ever to find their equals, it is some years since I have closed my accounts, and shut up my books, with thoughts of never opening them again: but you have kindled a desire in me of opening them once more before I die, which I now do; so go home, and dine with me.' This nobleman, I say, is a prodigy: for at 85 he has all the wit and promptness of a man of 30; a disposition to be pleased, and a power to please others beyond what-

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ever I knew! added to which, a man of learning, courtesy, and feeling."

His Lordship, in the latter part of his life, preserved his natural cheerfulness and vivacity, always accessible, hospitable, and beneficent. Lately he delighted in rural amusements; and enjoyed, with a philosophical satisfaction, the shade of the lofty trees he had planted himself. Till within a month of his death he constantly rode out on horseback two hours before dinner, and constantly drank his bottle of Claret or Madeira after dinner. He used to declare, in a jocular manner, he never could think of adopting Dr Cadogan's method, as Dr Cheyne had assured him, 50 years ago, he would never live seven years longer unless he abridged himself of his wine. Pursuant to this maxim, his Lordship having, about four years ago, invited several of his friends to spend a few cheerful days with him at his seat at Cirencester, and being one evening very loth to part with them; on his son the present chancellor's objecting to their sitting up any longer, and adding, that health and long life were best secured by regularity; he suffered him to retire: but, as soon as he was gone, the cheerful father said, "Come, my good friends, since the old gentleman is gone to bed, I think we may venture to crack another bottle."

His Lordship was advanced to the dignity of Earl in 1772; and lived to see the above nobleman, his eldest son, several years Lord High Chancellor of Great Britain, and promoted to the peerage in 1771 by the title of Baron Apsley. Lord Bathurst married Catherine daughter of Sir Peter Apsley, by whom he had two other sons, and five daughters. His death happened, after a few days illness, at his seat near Cirencester, in the 91st year of his age, and on the 16th of September 1775.

BATHYLLUS and **PYLADES**, inventors of pantomime entertainments on the stage. Bathyllus succeeded in representing comedy; Pylades, in tragedy. The art consisted in expressing the passions by gestures, attitudes, and dumb shew; not, as in modern times, in machinery, and the fooleries of Harlequin. They flourished at Rome, under Augustus, about A. D. 10. Each of them kept scholars, who perpetuated their master's name: for the followers of Bathyllus, who excelled in the comic part, called themselves *Bathylli*; and those of Pylades, who excelled in the tragic, called themselves *Pylades*.

BATMAN, in commerce, a kind of weight used at Smyrna, containing six ounces of 400 drams each, which amount to 16 pounds six ounces and 15 drams of English weight.

BATMANSON (John), prior of the Carthusian monastery, or Charter-house in the suburbs of London. He was some time a student at Oxford, but it does not appear that he took any degree in that university. He was intimately acquainted with Edward Lee archbishop of York, at whose request he wrote against Erasmus and Luther. He died in the year 1531, and was buried in the chapel belonging to the charter-house. According to Bale, he was a proud forward person; and he says that Erasmus, in one of his letters to the bishop of Winchester, calls him an ignorant fellow. Pits, on the contrary, gives him the character of a man of singular genius, zeal, piety, and learning. He wrote 1. *Animadversiones in annotationes*

Erasmi in Nov. Testamentum. 2. *A Treatise against some of Luther's works.* These two he afterwards retracted. 3. *Commentaria in proverbialia Solomonis.* 4. *In cantica canticorum.* 5. *De unica Magdalena.* 6. *Institutiones noviciorum.* 7. *De contemptu mundi.* 8. *De Christo duodenni.* 9. *On the words, missus est, &c.*

BATON, or **BASTON**. See **BASTON**.

BATRACHOMYOMACHIA, the battle of the frogs and the mice, the title of a fine burlesque poem generally ascribed to Homer.—The subject of the work is the death of Pylcharax, a mouse, son to Toxartes, who, being mounted on the back of Physignathus, a frog, on a voyage to her palace, to which he had invited him, was seized with fear when he saw himself in the middle of the pond, so that he tumbled off and was drowned. Physignathus being suspected to have shaken him off with design, the mice demanded satisfaction, and unanimously declared war against the frogs.

BATTÆ, (anc. geog.), a people of Germany, formerly inhabitants of what is now called *Hesse*. Being dissatisfied with their situation there, they settled on the island formed by the Vahalis and Rhine, which from them took the name of *Batavia*, or *Batavorum Insula*. Their government was a mixture of monarchy, aristocracy, and democracy. Their chief was, properly speaking, nothing more than a principal citizen, whose business was rather to advise than to command. The principal men who exercised jurisdiction, and commanded the troops, in their respective districts, were chosen, as well as the kings, in an assembly of the people. A hundred persons selected from among the people presided over every county, and acted as chiefs in the different hamlets. The whole nation was, in some measure, an army always in readiness. Each family composed a body of militia, which served under a captain of their own choosing. See *BATAVORUM Insula*.

BATTALIA, an army ranged in order of battle, or ready for engagement. The word seems formed from the Latin *batalia*, sometimes also written *batalia*, denoting a sort of military or gladiatorial exercise, as fighting with foils, or tilting at a post. In this sense, we meet with the depth of a battalia; to march in battalia, with the baggage in the middle; to break the battalia, &c. In the Roman battalia, the *hastati* made the front.

BATTALION, a small body of infantry, ranged in form of battle, and ready to engage.

A battalion usually contains from 500 to 800 men; but the number it consists of is not determined. They are armed with firelocks, swords, and bayonets; and divided into 13 companies, one of which is grenadiers. They are usually drawn up three men deep. Some regiments consist of but one battalion, others are divided into four or five.

BATTATAS, the Indian name of the potatoe. See **LYCOPERSICON**.

BATTEL, a town of Suffex, five miles north-west of Hastings, situated in E. Long. o. 35. N. Lat. 50. 55. It was formerly called *Epiton*; and is the place where William the Conqueror vanquished Harold king of England on October 14th 1066. William, in memory of this victory, erected an abbey, which he called *Battle Abbey*; and if a criminal could but reach this abbey, he was dismissed from thence, and was afterwards in no danger for his past faults. The abbey was a large and noble

noble structure, as may be judged by the gateway which is still entire, as well as from the other remains.

BATTEL, in law, or *Trial by wager of Battel*, a species of trial of great antiquity, but now much disused*. It seems to have owed its original to the military spirit of our ancestors, joined to a superstitious frame of mind; it being in the nature of an appeal to Providence, under an apprehension and hope (however presumptuous and unwarrantable) that heaven would give the victory to him who had the right. The decision of suits, by this appeal to the God of battels, is by some said to have been invented by the Burgundi, one of the northern or German clans that planted themselves in Gaul. And it is true, that the first written injunction of judiciary combats that we meet with, is in the laws of Gundebald, A. D. 501, which are preserved in the Burgundian code. Yet it does not seem to have been merely a local custom of this or that particular tribe, but to have been the common usage of all those warlike people from the earliest times. And it may also seem, from a passage in Velleius Paterculus, that the Germans, when first they became known to the Romans, were wont to decide all contests of right by the sword: for when Quintilius Varus endeavoured to introduce among them the Roman laws and method of trial, it was looked upon (says the historian) as a *novitatis incognita disciplina, ut solita armis decerni jure terminarentur*. And among the ancient Goths in Sweden we find the practice of judiciary duels established upon much the same footing as they formerly were in our own country.

This trial was introduced in England among other Norman customs by William the conqueror; but was only used in three cases, one military, one criminal, and the third civil. The first in the court-martial, or court of chivalry and honour; the second in appeals of felony; and the third upon issue joined in a writ of right, the last and most solemn decision of real property. For in writs of right the *jus proprietatis*, which is frequently a matter of difficulty, is in question; but other real actions being merely questions of the *jus possessionis*, which are usually more plain and obvious, our ancestors did not in them appeal to the decision of Providence. Another pretext for allowing it, upon these final writs of right, was also for the sake of such claimants as might have the true right, but yet by the death of witnesses or other defect of evidence be unable to prove it to a jury. But the most curious reason of all is given in the Mirror, that it is allowable upon warrant of the combat between David for the people of Israel of the one party, and Goliath for the Philistines of the other party: a reason which pope Nicholas I. very seriously decides to be inconclusive. Of battel therefore on a writ of right we shall first speak: and although the writ of right itself, and of course this trial thereof, be at present disused; yet, as it is law at this day, it may be matter of curiosity, at least, to inquire into the forms of this proceeding, as we may gather them from ancient authors.

1. The last trial by battel that was waged in the court of common pleas at Westminster (though there was afterwards one in the court of chivalry in 1631, and another in the county palatine of Durham in 1638) was in the 13th year of queen Elizabeth, A. D. 1571, as reported by Sir James Dyer; and was held in Tot-

hill-fields, Westminster, “*non sine magna juris consultorum perturbatione*,” saith Sir Henry Spelman, who was himself a witness of the ceremony. The form, as appears from the authors before cited, is as follows.

When the tenant in a writ of right pleads the general issue, *viz.* that he hath more right to hold, than the demandant hath to recover; and offers to prove it by the body of his champion, which tender is accepted by the demandant; the tenant in the first place must produce his champion, who, by throwing down his glove as a gage or pledge, thus wages or stipulates battel with the champion of the demandant; who, by taking up the gage or glove, stipulates on his part to accept the challenge. The reason why it is waged by champions, and not by the parties themselves, in civil actions, is because, if any party to the suit dies, the suit must abate and be at an end for the present; and therefore no judgment could be given for the lands in question, if either of the parties were slain in battel: and also that no person might claim an exemption from this trial, as was allowed in criminal cases, where the battel was waged in person.

A piece of ground is then in due time set out, of 60 feet square, enclosed with lifts, and on one side a court erected for the judges of the court of common pleas, who attend there in their scarlet robes; and also a bar is prepared for the learned serjeants at law. When the court sits, which ought to be by sunrising, proclamation is made for the parties, and their champions; who are introduced by two knights, and are dressed in a coat of armour, with red sandals, barelegged from the knee downwards, barcheaded, and with bare arms to the elbows. The weapons allowed them are only batons, or staves, of an ell long, and a four-cornered leather target; so that death very seldom ensued this civil combat. In the court military, indeed, they fought with sword and lance, according to Spelman and Rushworth; as likewise in France, only villeins fought with the buckler and baton, gentlemen armed at all points. And upon this, and other circumstances, the president Montesquieu hath with great ingenuity not only deduced the impious custom of private duels upon imaginary points of honour, but hath also traced the heroic madness of knight errantry from the same original of judicial combats. But to proceed:

When the champions, thus armed with batons, arrive within the lifts or place of combat, the champion of the tenant then takes his adversary by the hand, and makes oath that the tenements in dispute are not the right of the demandant; and the champion of the demandant, then taking the other by the hand, swears in the same manner that they are; so that each champion is, or ought to be, thoroughly persuaded of the truth of the cause he fights for. Next an oath against forcery and enchantment is to be taken by both the champions, in this or a similar form: “Hear this, ye justices, that I have this day neither eat, drank, nor have upon me neither bone, stone, ne grass; nor any enchantment, forcery, or witchcraft, whereby the law of God may be abused, or the law of the devil exalted. So help me God and his saints.”

The battel is thus begun, and the combatants are bound to fight till the stars appear in the evening: and, if the champion of the tenant can defend himself till the stars appear, the tenant shall prevail in his cause; for

Battel.

for it is sufficient for him to maintain his ground, and make it a drawn battel, he being already in possession; but, if victory declares itself for either party, for him is judgment finally given. This victory may arise, from the death of either of the champions: which indeed hath rarely happened; the whole ceremony, to say the truth, bearing a near resemblance to certain rural athletic diversions, which are probably derived from this original. Or victory is obtained, if either champion proves *recræant*, that is, yields, and pronounces the horrible word of *cræven*; a word of disgrace and obloquy, rather than of any determinate meaning. But a horrible word it indeed is to the vanquished champion: since, as a punishment to him for forfeiting the land of his principal by pronouncing that shameful word, he is condemned, as a *recræant*, *amittere liberam legem*, that is, to become infamous, and not be accounted *liber et legalis homo*; being supposed by the event to be proved forsworn, and therefore never to be put upon a jury or admitted as a witness in any cause.

This is the form of a trial by battel; a trial which the tenant, or defendant in a writ of right, has it in his election at this day to demand; and which was the only decision of such writ of right after the conquest, till Henry II. by consent of parliament introduced the *grand assise*, a peculiar species of trial by jury, in concurrence therewith; giving the tenant his choice of either the one or the other. Which example, of discountenancing these judicial combats, was imitated about a century afterwards in France, by an edict of Louis the Pious, A. D. 1260, and soon after by the rest of Europe. The establishment of this alternative, Glanvil, chief justice to Henry II. and probably his adviser herein, considers as a most noble improvement, as in fact it was, of the law.

2. In appeals * of felony, the trial by battel may be demanded, at the election of the appellee, in either an appeal or an approvement; and it is carried on with equal solemnity as that on a writ of right; but with this difference, that there each party hires a champion, but here they must fight in their proper persons. And therefore, if the appellant or approver be a woman, a priest, an infant, or of the age of 60, or lame, or blind, he or she may counterplead and refuse the wager of battel; and compel the appellee to put himself upon the country. Also peers of the realm, bringing an appeal, shall not be challenged to wage battel, on account of the dignity of their persons; nor the citizens of London, by special charter, because fighting seems foreign to their education and employment. So likewise, if the crime be notorious; as if the thief be taken with the *mainour*, or the murderer in the room with a bloody knife, the appellant may refuse the tender of battel from the appellee; and it is unreasonable an innocent man should stake his life against one who is already half-convicted.

The form and manner of waging battel upon appeals are much the same as upon a writ of right; only the oaths of the two combatants are vastly more striking and solemn. The appellee, when appealed of felony, pleads *not guilty*; and throws down his glove, and declares he will defend the same by his body: the appellant takes up the glove; and replies that he is ready to make good the appeal, body for body. And thereupon, the appellee taking the book in his right hand,

and in his left the right hand of his antagonist, swears to this effect: *Hoc audi, homo, quem per manum teneo*, &c. "Hear this, O man, whom I hold by the hand, who callest thyself *John* by the name of baptism, that I, who call myself *Thomas* by the name of baptism, did not feloniously murder thy father, *William* by name, nor am any way guilty of the said felony. So help me God, and the saints; and this I will defend against thee by my body, as this court shall award." To which the appellant replies, holding the bible and his antagonist's hand in the same manner as the other: "Hear this, O man whom I hold by the hand, who callest thyself *Thomas* by the name of baptism, that thou art perjured; and therefore perjured, because that thou feloniously didst murder my father, *William* by name. So help me God, and the saints; and this I will prove against thee by my body, as this court shall award." The battel is then to be fought, with the same weapons, *viz.* batons, the same solemnity, and the same oath against amulets and sorcery, that are used in the civil combat; and if the appellee be so far vanquished that he cannot or will not fight any longer, he shall be adjudged to be hanged immediately; and then, as well as if he be killed in battel, Providence is deemed to have determined in favour of the truth, and his blood shall be attained. But if he kills the appellant, or can maintain the fight from sunrising till the stars appear in the evening, he shall be acquitted. So also, if the appellant becomes *recræant*, and pronounces the horrible word *cræven*, he shall lose his *liberam legem*, and become infamous; and the appellee shall recover his damages, and also be for ever quit, not only of the appeal, but of all indictments likewise for the same offence.

BATTEN, a name that workmen give to a scantling of wooden stuff, from two to four inches broad, and about one inch thick; the length is pretty considerable, but undetermined.—This term is chiefly used in speaking of doors and windows of shops, &c. which are not framed of whole deal, &c. with stiles, rails, and panels like wainscot; but are made to appear as if they were, by means of these battens, bradded on the plain board round the edges, and sometimes cross them, and up and down.

BATTENBURG, a town of Dutch Guelderland, seated on the north banks of the Meuse, almost opposite to Ravenstein. E. Long. 5. 35. N. Lat. 50. 55.

BATTERING, the attacking a place, work, or the like, with heavy artillery.

To batter in breach, is to play furiously on a work, as the angle of a half-moon, in order to demolish and make a gap therein. In this they observe never to fire a piece at the top, but all at the bottom, from three to six feet from the ground.

The battery of a camp is usually surrounded with a trench, and palisadoes at the bottom, with two redoubts on the wings, or certain places of arms, capable of covering the troops which are appointed for their defence. See BATTERY.

BATTERING-RAM, in antiquity, a military engine used to batter and beat down the walls of places besieged. It is said to have been invented by Artemanes of Clazomene, a Greek architect who flourished 441 B. C.—The machine is thus described by Josephus: It is a vast beam, like the mast of a ship, strengthened

at

* See App.
2^{tal}.

ing, at the one end with a head of iron, something resembling that of a ram, whence it took its name. This was hung by the middle with ropes to another beam, which lay across two posts; and hanging thus equally balanced, it was by a great number of men drawn backwards and pushed forwards, striking the wall with its iron head. But this engine did most execution when it was mounted on wheels, which is said to have been first done at the siege of Byzantium under Philip of Macedon.

Plutarch informs us, that Marc Anthony, in the Parthian war, made use of a ram fourscore feet long: and Vitruvius tells us, that they were sometimes 106, and sometimes 120, feet in length; and to this perhaps the force and strength of the engine was in a great measure owing. The ram was managed at one time by a whole century of soldiers; and they being spent, were seconded by another century, so that it played continually without any intermission.

Plate LVII. fig. 1. represents the battering-ram suspended. 2, The ram. 3, The form of its head, fastened to the enormous beam by three or four bands of iron, four feet in breadth. At the extremity of each of these bands (4) was a chain (5) of the same metal, one end of which was fastened to a hook (6), and at the other extremity of each of these chains was a cable firmly bound to the last link. These cables ran the whole length of the beam to the end of the ram (7), where they were all bound together as fast as possible with small ropes. To the end of these cables another was fixed, composed of several strong cords platted together to a certain length, and then running single (8). At each of these several men were placed, to balance and work the machine. 10, The chain or cable by which it hung to the cross beam (11), fixed on the top of the frame. 12, The base of the machine.—The unsuspended ram differed from this only in the manner of working it: for, instead of being slung by a chain or cable, it moved on small wheels on another large beam.

BATTERING-Rams, in heraldry, a bearing, or coat of arms, resembling the military engine of the same name.

BATTERY, in the military art, a parapet thrown up to cover the gunners, and men employed about the guns, from the enemy's shot. This parapet is cut into embrasures, for the cannon to fire through. The height of the embrasures, on the inside, is about three feet; but they go sloping lower to the outside. Their wideness is two or three feet, but open to fix or seven on the outside. The mass of earth that is betwixt two embrasures, is called the *merlon*. The platform of a battery is a floor of planks and sleepers, to keep the wheels of the guns from sinking into the earth; and is always made sloping towards the embrasures, both to hinder there verie, and to facilitate the bringing back of the gun.

BATTERY of Mortars differs from a battery of guns; for it is sunk into the ground, and has no embrasures.

Cross-BATTERIES are two batteries, which play athwart one another upon the same object, forming there an angle, and beating with more violence and destruction; because what one bullet shakes, the other beats down.

BATTERY sunk or buried, is when its platform is sunk, or let down into the ground, so that there must be trenches cut in the earth, against the muzzles of the

guns, for them to fire out at, and to serve for embrasures.

BATTERY d' Enfilade, is one that scours or sweeps the whole length of a straight line.

BATTERY en Echarpe is that which plays obliquely. **BATTERY de Reverse**, that which plays upon the enemy's back.

Camerade BATTERY is when several guns play at the same time upon one place.

BATTERY, in law, is the unlawful beating of another. The least touching of another's person wilfully, or in anger, is a battery: for the law cannot draw the line between different degrees of violence, and therefore totally prohibits the first and lowest stage of it; every man's person being sacred, and no other having a right to meddle with it, in any the slightest manner. And therefore, upon a similar principle, the Cornelian law *de injuriis* prohibited *pulsation* as well as *verberation*; distinguishing verberation, which was accompanied with pain, from pulsation which was attended with none. But battery is, in some cases, justifiable or lawful; as where one who hath authority, a parent or master, gives moderate correction to his child, his scholar, or his apprentice. So also on the principle of self-defence: for if one strikes me first, or even only assaults me, I may strike in my own defence; and, if sued for it, may plead *son assault demesne*, or that it was the plaintiff's own original assault that occasioned it. So likewise in defence of my goods or possession, if a man endeavours to deprive me of them, I may justify laying hands upon him to prevent him; and in case he persists with violence, I may proceed to beat him away. Thus too in the exercise of an office, as that of church-warden or beadle, a man may lay hands upon another to turn him out of church, and prevent his disturbing the congregation. And, if sued for this or the like battery, he may set forth the whole case, and plead that he laid hands upon him gently, *moliter manus imposuit*, for this purpose. On account of these causes of justification, battery is defined to be the unlawful beating of another; for which the remedy is, as for assault, by action of *trespass vi et armis*: wherein the jury will give adequate damages.

BATTISTA (Franco), a celebrated painter, born at Venice, was one of the disciples of Michael Angelo, whose manner he followed so closely, that, in the correctness of his out-lines, he surpassed most of the masters of his time. His paintings are pretty numerous, and dispersed all over Italy, and other parts of Europe; but his colouring being very dry, they are not much more esteemed than the prints etched by his hand. He died in 1561.

BATTLE, a general engagement between two armies, in a country sufficiently open for them to encounter in front and at the same time. The word is also written *battel*, *battell*, and *battail*. It is formed from the French *bataille*, of the Latin verb *battuere*, to fence, or exercise with arms: whence *batalia*, and *batalia*, which properly denoted the action or exercise of those who learned to fence, and who were hence also denominated *batuatores*.

The ancients never joined battle without much ceremony and preparation; as taking auguries, offering sacrifice, haranguing the soldiers, giving the word or a *tessera*, &c. The signals of battle were,

founding the *classeum* or general charge, and displaying a peculiar flag called by Plutarch a *purple robe*. To which may be added, singing pœans, raising military shouts, and the like. A Roman legion, ranged in order of battle, consisted of *hastati*, placed in the front; of *principes*, who were all old experienced soldiers, placed behind the former; and of *triarii*, heavy armed with large bucklers, behind the *principes*. The *hastati* were ranked close; the ranks of the *principes* were much opener, so that they could receive the *hastati*; and those of the *triarii* opener still, inasmuch that they could receive both the *principes* and the *hastati* within them, without any disorder, and still facing the enemy. When therefore the *hastati* found themselves unable to stand the enemy's charge, they retired gently within the *principes*, where joining with them, they renewed the combat. If these found themselves too weak to sustain the enemy, both retired among the *triarii*, where rallying, they formed a new corps, and charged with more vigour than ever. If these failed, the battle was lost; the Romans had no further resource. The moderns are unacquainted with this method of inserting or embatteling one company into another; without which the former cannot be well succoured or defended, and their places taken by others; which was a thing the Romans practised with great exactness. For the *velites*, and in later times the archers and slingers, were not drawn up in this regular manner, but either disposed of before the front of the *hastati*, or scattered up and down among the void spaces of the *hastati*, or sometimes placed in two bodies in the wings. These always began the combat, skirmishing in flying parties with the foremost troops of the enemy. If they were repulsed, which was usually the case, they fell back to the flanks of the army, or retired again in the rear. When they retired, the *hastati* advanced to the charge. As to the cavalry, it was posted at the two corners of the army, like the wings on a body; and fought sometimes on foot, sometimes on horseback. The auxiliary forces composed the two points of the battle, and covered the whole body of the Romans.—Other less usual forms of battle among the Romans were the *cuneus*, or wedge; *globus*, or round form; *forfex*, or pair of sheers; *turris*, or an oblong square figure; *ferra*, or saw. The Greeks were inferior to the Romans in marshalling their armies for battle, as they drew up their whole army in a front, and trusted the success of the day to a single force. They had three forms of battle for the horse, viz. the square, the wedge, and the rhombus or diamond form. The first held best for the defensive; the latter for the offensive; the wedge being preferred as bringing most hands to fight.

The Greeks notified the places of their battles and victories by adding the word *Nomen* whence Nicomedia, Nicopolis, Thessalonica, &c. The ancient Britons did the like, by adding the word *Mai*; whence Maifest, Malmaifest, &c. The English by the word *Field*.—The Romans had their particular days, called *præliæ dies*, wherein alone it was lawful to join battle; and others wherein it was unlawful, called *dies atri*. The Athenians, by the ancient laws of their country, were not to draw out their forces for battle till after the seventh day of the month. And Lucian relates of the Lacedæmonians, that, by the laws of Lycurgus,

they were not to fight before full moon. Among the Germans, it was reputed an impiety to fight in the wane of the moon; and Cæsar tells us, that Ariovistus was beaten by him, because, contrary to the laws of his country, he had fought when the moon was in her wane. The German soldiers were intimidated with the apprehension, and afforded Cæsar an easy victory; *acile commissis, impeditis religione hostes vicit*. It is well known that Jerusalem was taken by Pompey in an attack on the sabbath-day, when, by the Jewish superstitious notions, they were not allowed to fight, or even to defend themselves. The Romans did not carry their superstition so far: their *atri dies* were only observed in respect of attacking; no day was too holy for them to defend themselves in. Among the ancients, we find frequent instances of battles in the night: it was by the moonlight that Pompey beat Mithridates, and Scipio, Afrubal and Syphax.

The first pitched battle, of which we have any distinct account, is that between Cræsus and Cyrus, described by Xenophon, concerning which we have a dissertation expressly by M. Freret, wherein several points of the ancient tactics are well explained. In the modern war, we find few pitched or set battles: the chief view of the great commanders of late days is rather to harraß or starve the enemy by frequent alarms, cutting off his provisions, carrying off his baggage, seizing his posts, &c. than to join issue with him, and put the whole on the event of one day; a battle generally deciding the fate of a campaign, sometimes of a whole war. Hence it is a rule, never to venture a general battle, unless either you fight to advantage, or be forced to it. Joining or giving battle should always be by design: a general should never suffer himself to be forced to fight. All the measures, movements, encampments, he makes, are to lead to the execution of his great design, which is to fight to advantage, till, by some mistake of the enemy, he at length find the favourable opportunity. It is in this that a superior genius will at length prevail over an inferior: in the course of a campaign, he will take a number of advantages over him, which, together, are equivalent to a battle, the event of which is ever doubtful.

BATTLE-AXE, an ancient military weapon. Axes were a principal part of the offensive armour of the Celts. At the siege of the Roman Capitol by the Gauls under Brennus, we find one of the most distinguished of their warriors armed with a battle-axe. And Ammianus Marcellinus, many centuries afterwards describing a body of Gauls, furnishes them all with battle axes and swords. Some of these weapons have been found in the sepulchres of the Britons, on the downs of Wiltshire and in the north of Scotland. Within these four or five centuries the Irish went constantly armed with an axe. And the axe of Lochaber hath remained a formidable implement of destruction in the hands of our Highlanders, even nearly to the present period.

BATTLEMENTS, in architecture, are indentures or notches in the top of a wall or other building, in the form of embrasures, for the sake of looking thro' them.

BATTOLOGY, in grammar, a superfluous repetition of some words or things.

BATUA, **ΒΥΤΥΑ**, *Buthoe*, or *Buthoece*, (anc. geog.),

a town of Dalmatia, situated on the Adriatic: now *Bu-
doz*; which see.

BATZ, a copper coin mixed with some silver, and current at different rates, according to the alloy, in Nuremberg, Basil, Fribourg, Lucerne, and other cities of Germany and Switzerland.

BAVARIA, a duchy and electorate of Germany. This duchy was formerly a kingdom, which extended from the mountains of Franconia to the frontiers of Hungary and the Adriatic Gulph. It comprehended the countries of Tirol, Carinthia, Carniola, Stiria, Austria, and other states, which are now fallen to different princes. At present it is bounded on the east by Bohemia and Austria, on the west by Suabia, on the north by Franconia, and on the south by Tirol. But the duke of Bavaria is not absolute master of all this country; for within its bounds are situated many free cities, among which is Ratibon, and several lordships both ecclesiastical and secular. It is divided into Upper and Lower Bavaria; and these two provinces consist of twelve counties, which formerly sufficed to make a duchy, according to the laws of Franconia. The country is watered by five navigable rivers, besides several smaller ones, and 16 lakes.—It contains 35 cities, of which Munich is the capital; 94 towns; 720 castles; 4700 villages; eight great abbeys; and 75 cloisters or monasteries, besides those of the mendicants.—It is divided into four great bailliages called *governments*. These are Munich, Landshut, Straubing, and Burkhäufen. The principal cities are Ingolstadt, Donauwerk, Landberg, Freiberg, Straubingen, Wilshausen, Wasserberg, Eling, Rain, &c.

Besides these two provinces, the duke of Bavaria possesses the upper palatinate of Westphalia, which has been united to Bavaria, and comprehends several counties, cities, towns, and villages. On the other side of this province is *Chamb*, the chief city of the county of the same name, belonging likewise to the duke of Bavaria. He also possesses the landgraviate of Leichtenberg, which fell to him by the death of Maximilian Adam, in consequence of family pacts made between the house of Bavaria and that of Leichtenberg for their mutual succession. In 1567, the county of Kaag fell to the duke of Bavaria by the death of Ladislaus the last count of that name. There are likewise family pacts of mutual succession established betwixt the house of Bavaria and the Palatine of the Rhine.—The inhabitants of this country are strong and laborious, exercising themselves in shooting with rifled muskets at a mark, in order to render themselves more expert in war.

The house of Bavaria is universally allowed to be one of the most ancient in Germany. The counts of *Scheyren*, whose castle at present is a cloister, gave them the name. At that place are shewn the tombs of more than 26 lords of Scheyren. The emperor Otho I. established as counts-palatine of Bavaria and landgraves of Scheyren, Arnolph and Herman, sons of Arnolph brother to the duke of Berchtold of Carinthia, marquis of the county upon the Ens. After the death of Berchtold, the same emperor, instead of giving Bavaria to his son, gave it to duke Henry his brother, who had married Judith sister to Arnolph and Herman. This duke Henry of Bavaria, had, by his marriage, Henry Hezillon, who was succeeded by his son Henry, afterwards chosen emperor by the name of Henry II.

This emperor having no children by Saint Cunegond his wife, Bavaria passed again to the family of Franconia, and afterwards to that of Suabia, under Henry IV. who possessed it till the year 1071, when this last emperor gave that county to count Wolf, or Gueff, of Ravenburg in Suabia. To this Gueff, who died in the island of Cyprus, succeeded Gueff II. and to him his brother duke Henry IX. who was succeeded by his son Henry the Proud. This last had married the only daughter of the emperor Lotharius, and after the death of his father-in-law, became also duke of Saxony; but refusing to deliver up the imperial ornaments of his father-in-law to the emperor Conrad III. duke of Suabia, or to acknowledge him for emperor, he was put to the ban of the empire, and lost his states. After the death of Henry, Conrad made his brother Leopold marquis of Austria, and duke of Bavaria; who, dying without issue, was succeeded by his brother Henry XI. whom the emperor Frederic I. made duke of Austria, joining together the two counties above and below the Ens, and declaring them free and independent of the government of Bavaria. The same emperor gave Bavaria thus dismembered, with Saxony, to Henry the Lion, son of Henry the Proud. But Henry the Lion afterwards losing the favour of this emperor, was put to the ban of the empire; and lost all his possessions except Brunswick and Lunenburg, which still remain to his descendants. In 1180, the duchy of Bavaria was given by the emperor to Otho the Landgrave of Wittelsbach, count Palatine of the house of Bavaria. In the time of this Otho, the castle of Scheyren was changed into a monastery in which the duke was buried. From him are descended the two great families that remain to this day in Germany; viz. the counts Palatine of the Rhine, and the present electors of Bavaria.

BAVAY, a small town of the province of Hainault in French Flanders; which has been often ruined by the wars of the low countries. E. Long. 3. 45. N. Lat. 50. 25.

BAUCIS, in fabulous history, an old woman who lived with Philemon her husband in a cottage in Phrygia. Jupiter and Mercury, travelling over that country, were well received by them, after having been refused entertainment by every body else. To punish the people for their inhumanity, these gods laid the country waste with water; but took Baucis and Philemon with them to the top of a mountain, where they saw the deluge, and their own little hut above the waters, turned into a temple: having a wish granted them, they desired to officiate in this temple as priest and priestess, and also that they might die both together; which was granted them.

BAUCONICA, (anc. geog.), a town of the Vangiones in Gallia Belgica; nine miles from Mogontiacum, and eleven from Borbitomagus; and therefore supposed to be *Oppenheim*, a town in the Palatinate of the Rhine, and situated on that river *.

BAUDELLOT (Charles Cæsar), a learned advocate in the parliament of Paris, distinguished himself by his skill in ancient monuments, and was received into the academy of Belles Lettres in 1705. He wrote a Treatise on the Advantages of Travelling; many Letters and Dissertations on Medals, &c.; and died in 1722, aged 74.

Bavaria
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Baudelot.

* See *Oppenheim*.

Baudier
Bauh.

BAUDIER (Michael), a gentleman of Languedoc, lived in the reign of Lewis XIII. and published several books, which procured him the character of a copious and laborious author; among which are, 1. An Inventory of the General History of the Turks. 2. The History of the Seraglio. 3. That of the Religion of the Turks. 4. That of the Court of the King of China. 5. The Life of Cardinal Ximenes, &c.

BAUDIUS (Dominic), professor of history in the university of Leyden, born at Lisse, the 8th of Angult, 1561. He began his studies at Aix la Chapelle, and continued them at Leyden. He removed from thence to Geneva, where he studied divinity: after residing here some time, he returned to Ghent, and from thence to Leyden, where he applied to the civil law, and was admitted doctor of law in June 1585. Soon after his admission, he accompanied the ambassadors from the States to England, and during his residence here became acquainted with several persons of distinction, particularly the famous Sir Philip Sidney. He was admitted advocate at the Hague, the 5th of January, 1587; but being soon tired of the bar, went to travel in France, where he remained 10 years. He was much esteemed in that kingdom, and gained many friends there. Achilles de Harlai, first president of the parliament of Paris, got him to be admitted advocate of the parliament of Paris in the year 1592. In 1602, he went to England with Christopher de Harlai, the president's son, who was sent ambassador to the court of London by Henry the Great. This same year Baudius having been named professor of eloquence at Leyden, went and settled in that university. He read lectures on history after the death of Morula, and was permitted also to do the same on the civil law. In 1611, the States conferred upon him the office of historiographer in conjunction with Meursius; and in consequence thereof he wrote The History of the Truce. Baudius is an elegant prose-writer, as appears from his Letters, many of which were published after his death. He was also an excellent Latin poet: the first edition of his poems was printed in the year 1587; they consist of verses of all the different measures: he published separately a book of iambics in 1591, dedicated to cardinal Bourbon. Some of his poems he dedicated to the king of England; others to the prince of Wales, in the edition of 1607, and went over to England to present them. He died at Leyden in 1613.

BAUDOBRIGA, (anc. geog.), a town of the Treviri in Germany; now *Boppard*, in the electorate of Triers. See *BOPPART*.

BAUDRAND (Michael Anthony), a celebrated geographer, born at Paris, July 18. 1633. He travelled into several countries; and then applied himself to the revival of Ferrarius's Geographical Dictionary, which he enlarged by one-half. He wrote, 1. Notes to Papirus Masio's Description of the Rivers of France. 2. A Geographical and Historical Dictionary. 3. Christian Geography, or an Account of the Archbishopricks and Bishopricks of the whole World; and made several maps. He died at Paris, May 29. 1700.

BAUHIN (John), a great botanist, was born about the middle of the 16th century. He took his doctor's degree in physic, in 1562; and afterwards became principal physician to Frederick duke of Wir-

temberg. The most considerable of his works is his *Universal History of Plants*.

BAUHIN (Caspar, or Gaspar), younger brother to the preceding, was born at Basil, 1550; and distinguished himself by his skill in anatomy and botany. In 1580, he was chosen first professor of these sciences at Basil; and in 1614, was made first professor of physic, and first physician of that city, which he held till his death, which happened in 1623, at the age of 63. He wrote, 1. Anatomical Infiltrations; 2. *Prodromus Theatri Botanici*; and other works.

BAUGE, a small town of Anjou in France, seated on the River Coefnon. E. Long. 6. 10. N. Lat. 47. 30.

BAUGE, a town of Bresse in France, with the title of a marquise. It is pleasantly situated on a fruitful hill, in E. Long. 4. 54. N. Lat. 46. 20.

BAUHINIA, MOUNTAIN EBONY; (named *Bauhinia* by Father Plumier, in honour of the two famous botanists John and Caspar Bauhins); a genus of the monogynia order, belonging to the decandria class of plants.

Species, 1. The aculeata, with a prickly stalk, is very common in Jamaica, and other American sugar-islands, where it rises to the height of 16 or 18 feet, with a crooked stem, and divides into many irregular branches armed with strong short spines, garnished with compound winged leaves, each having two or three pair of lobes ending with an odd one, which are oblique, blunt, and indented at the top. The stalks are terminated by several long spikes of yellow flowers, which are succeeded by bordered pods about three inches long, containing two or three swelling seeds. These pods are glutinous, and have a strong balsamic scent, as have also the leaves when bruised. It is called in America the *Javin-tree*, from its strong odour somewhat resembling the common favin. 2. The tomentosa, with heart-shaped leaves, is a native of Campeachy; and rises to the height of 12 or 14 feet, with a smooth stem dividing into many branches, garnished with heart-shaped leaves, having two smooth-pointed lobes. The extremity of every branch is terminated by a long spike of yellow flowers, so that when these trees are in flower they make a fine appearance. 3. The acuminata, with oval leaves, is a native of both the Indies; and rises with several pretty strong, upright, smooth stems, sending out many slender branches, garnished with oval leaves deeply divided into two lobes. The flowers come out at the extremities of the branches, three or four in a loose bunch; some of the petals are red, or striped with white, but others are plain upon the same branch; the stamina and style are white, and stand out beyond the petals. These flowers are succeeded by long pods of a dark brown colour, each containing five or six roundish compressed seeds. The wood of this tree is very hard, and veined with black; whence its name of *mountain ebony*. 4. The variegata, with heart-shaped leaves, and lobes joining together; this is likewise a native of both the Indies. It rises with a strong stem upwards of 20 feet high, dividing into many strong branches, garnished with heart-shaped leaves having obtuse lobes which close together. The flowers are large, and grow in loose panicles at the extremity of the branches. They are of a purplish red colour marked with white, and have a yellow bottom. The flowers have a very agreeable scent, and are succeeded

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ceeded by compressed pods about six inches long, and three quarters of an inch broad, containing three or four compressed seeds in each. 5. The divaricata, with oval leaves whose lobes spread different ways. This grows naturally in great plenty on the north side of the island of Jamaica. It is a low shrub, seldom rising more than five or six feet high, but divides into several branches garnished with oval leaves dividing into two lobes that spread out from each other. The flowers grow in loose panicles at the end of the branches, have a white colour, and a very agreeable scent. The flowers appear the greatest part of the summer, so the plant is one of the greatest beauties of the hot-house. The flowers are succeeded by taper pods about four inches long, each containing four or five roundish compressed seeds of a dark colour. Besides these, five other species of baubinia are enumerated, but the above are the most remarkable. All the species of this plant are propagated by seeds, which must be sown on hot-beds, and the plants reared in a bark-house.

BAUM, in botany. See MELISSA.

BAUME (St), a mountain of Provence in France, between Marseilles and Toulon. Here Mary Magdalen is said to have died, on which account it is much frequented.

BAUME-les-Nonnes, a town of Franche Comte, with a rich nunnery, seated on the river Doux, in E. Long. 6. 20. N. Lat. 47. 12. Five miles from this town is a remarkable cavern, whose entrance is 20 paces wide; and after descending 300 paces, the gate of a grotto is seen, twice as large as that of a city. The grotto is 35 paces deep, 60 wide, and is covered with a kind of a vaulted roof, from which water continually drops. There is also a small brook, said to be frozen in summer, but not in winter; and at the bottom are stones that exactly resemble candied citron-peel. When the peasants perceive a mist rising out of this cave, they affirm that it will certainly rain the next day.

BAUMEN, or BAUMAN, a cave of West Saxony in Germany, about a mile from Wermigrode, and 18 from Goslar. The entrance is through a rock; and so narrow, that not above one person can pass at a time. There are several paths in it, which the peasants have turned up, in searching for the bones of animals which they fell for unicorn's horns. Some think this cave reaches as far as Goslar; but be this as it will, the skeletons of men have been found in it, who are supposed to have been lost in the turnings and windings.

BAUR (William), an eminent Flemish painter, was born at Strasbourg, and was the disciple of Brendel. He was some time at Rome, where his studies were wholly employed about architecture and landscapes, which prevented his studying the antique. He painted small figures in distemper on vellum. He etched with great spirit. His largest works are in the historical way. He has given us many of the sieges, and battles, which wasted Flanders in the 16th century. They may be exact, and probably they are: but they are rather plans than pictures; and have little to recommend them but historic truth, and the freedom of the execution. His best prints are some characters he has given us of different nations, in which the peculiarities of each are very well preferred. His Ovid is a poor performance. He died at Vienna in 1640.

BAUSK, or БАУТКО, a small but important town

in the duchy of Courland, on the frontiers of Poland, with a strong castle built on a rock. It was taken by the Swedes in 1625, and by the Russians in 1705, after a bloody battle between them and the Swedes. It is seated on the river Mufa, in E. Long. 24. 44. N. Lat. 56. 30.

BAUTRY, or BAWTRY, a town in the west riding of Yorkshire, on the road from London to York. It has long been noted for millstones and grindstones brought hither by the river Idle, on which it is seated. W. Long. 1. 0. N. Lat. 53. 27.

BAUTZEN, or BUDISSEN, a considerable town of Germany and capital of Upper Lusatia, subject to the elector of Saxony, with a strong citadel. The Protestants as well as Papists have here the free exercise of their religion. E. Long. 14. 42. N. Lat. 51. 10.

BAUX, a town of Provence in France, with the title of a marquise, seated on a rock at the top of which is a strong castle. E. Long. 5. 0. N. Lat. 43. 42.

BAWD, a person who keeps a place of prostitution, or makes a trade of debauching women, and procuring or conducting criminal intrigues. Some think the word is derived from the old French *baude*, bold or impudent; though Vertegan has a conjecture which would carry it higher, viz. from *bathe* anciently written *bade*. In which sense *bawd* originally imported no more than bath-holder, as if bagnios had anciently been the chief scenes of such prostitution.

The Romans had their male as well as female bawds; the former denominated *lenones* and *proagagi*, among us *panders*; the latter, *lenæ*. Donatus, speaking of the habits of the ancient characters in comedy, says, *Leno palis varii coloris utitur*. But the ancient *lenones*, it is to be observed, furnished boys as well as girls for venereal service. Another sort of these merchants or dealers in human flesh, were called *managers*, by the Greeks *ανδρακαπηλοι*, who sold eunuchs, slaves, &c. By a law of Constantine, bawds were to be punished by pouring melted lead down their throats. See the next article.

BAWDY-HOUSE, a house of ill fame, to which lewd persons of both sexes resort, and there have criminal conversation.

The keeping a bawdy-house is a common nuisance, not only on account that it endangers the public peace by drawing together debauched and idle persons, and promoting quarrels, but likewise for its tendency to corrupt the manners of the people. And therefore persons convicted of keeping bawdy-houses, are punishable by fine and imprisonment; also liable to stand in the pillory, and to such other punishment as the court at their discretion shall inflict. Persons resorting to a bawdy-house are likewise punishable, and they may be bound to their good behaviour.—It was always held infamous to keep a bawdy-house; yet some of our historians mention bawdy-houses publicly allowed here in former times till the reign of Hen. 8. and assign the number to be 18 thus allowed on the bank-side in Southwark. See STREWS and BROTHEL.

BAWLING, among sportsmen, is spoke of the dogs when they are too busy before they find the scent good.

BAXTER (Richard), an eminent divine among the nonconformists, was born at Rowton in Shropshire, November 12. 1615; and distinguished himself by

Baxter.

by his exemplary life, his pacific and moderate principles, and his numerous writings. He was remarkable for his piety, even when he was very young. Upon the opening of the long parliament, he was chosen vicar of Kidderminster. In the heat of the civil wars he withdrew from that town to Coventry, and preached to the garrison and inhabitants. When Oliver Cromwell was made protector, he would by no means comply with his measures, though he preached once before him. He came to London just before the deposing of Richard Cromwell, and preached before the parliament the day before they voted the return of king Charles II. who upon his restoration appointed him one of his chaplains in ordinary. He assisted at the conference in the Savoy, as one of the commissioners for stating the fundamentals in religion, and then drew up a reformed liturgy. He was offered the bishoprick of Hereford; which he refused; affecting no higher preferment than the liberty of continuing minister of Kidderminster; which he could not obtain, for he was not permitted to preach there above twice or thrice after the restoration. Whereupon he returned to London, and preached occasionally about the city, till the act of uniformity took place. During the plague in 1665 he retired into Buckinghamshire; but afterward returned to Aſton, where he staid till the act against conventicles expired; and then his audience was so large, that he wanted room. Upon this he was committed to prison; but procuring an habeas corpus, he was discharged. After the indulgence in 1672, he returned to London; and in 1682 he was seized for coming within five miles of a corporation. In 1684 he was seized again; and in the reign of king James II. was committed prisoner to the king's bench, and tried before the lord chief justice Jefferies for his Paraphrase on the New Testament, which was called a *scandalous and seditious* book against the government. He continued in prison two years; from whence he was at last discharged, and had his fine remitted by the king. He died December the 8th, 1691; and was buried in Christ-Church.—He was honoured with the friendship of some of the greatest and best men in the kingdom, (as the earl of Lauderdale, the earl of Balcarras, lord chief justice Hales, Dr Tillotson, &c. and held correspondence with some of the most eminent foreign divines.—He wrote above 120 books, and had above 60 written against him. The former, however, it should seem, were greatly preferable to the latter; since Dr Barrow, an excellent judge, says, that “his practical writings were never mended, his controversial seldom confuted.”—Among his most famous works were, 1. The Saints Everlasting Rest. 2. Call to the Unconverted, of which 20,000 were sold in one year; and it was translated not only into all the European languages, but into the Indian tongue. 3. Poor Man's Family Book. 4. Dying Thoughts; and, 5. A Paraphrase on the New Testament. His practical works have been printed in four volumes folio.

BAXTER (William), nephew and heir to the former, was an eminent schoolmaster and critic. He was born at Lanugany in Shropshire, in the year 1650; and it is remarkable, that at the age of 18, when he first went to school, he knew not one letter nor understood one word of any language but Welsh; but he so well improved his time, that he became a person of great and

extensive knowledge. His genius led him chiefly to the study of antiquities and philology, in which he composed several books. The first he published was a Grammar, in 1679, intitled *De Analogia seu Arte Latine Lingue Commentariolus*. He also published a new and correct edition of Anacreon, with Notes; an edition of Horace; a Dictionary of the British antiquities, in Latin; and several other books. He was a great master of the ancient British and Irish tongues, was particularly skilled in the Latin and Greek, and in the northern and eastern languages. He died May 31st, 1723, after being above 20 years master of Mercer's School in London.

BAY, in geography, an arm of the sea shooting up into the land and terminating in a nook. It is a kind of lesser gulph bigger than a creek, and is larger in its middle within than at its entrance. The largest and most noted bays in the world are those of Biscay, Bengal, Hudson's, Panama, &c.

BAY denotes likewise a pond-head made to keep in store of water for driving the wheels of the furnace or hammer belonging to an iron mill, by the stream that comes thence through a flood-gate called the *pen-fluck*.

BAY-Colour denotes a sort of red inclining to chestnut, chiefly used in speaking of horses. In this sense, the word *bay* is formed from the Latin *baius*, or *badius*, and that from the Greek βαῖος, a palm branch; so that *badius* or *bay* properly denotes *color phœniceus*. Hence also, among the ancients, those now called *bay* horses, were denominated *equi palmati*. We have divers sorts and degrees of bays; as a light bay, a dapple bay, &c. All bay horses are said to have black manes; which distinguishes them from sorrels, which have red or white manes.

BAY, among huntsmen, is when the dogs have earthed a vermin, or brought a deer, boar, or the like, to turn head against them. In this case, not only the deer, but the dogs, are said to *bay*. It is dangerous going in to a hart at bay, especially at rutting-time; for then they are fiercest. There are bays at land, and others in the water.

BAY-Tree. See LAURUS.

BAY-Salt. See SALT.

BAYA, or **BAJA**, a town of Lower Hungary, in the county of Bath, situated near the Danube. E. Long. 19. 30. N. Lat. 46. 25.

BAYARD (Peter du Terrail de), esteemed by his contemporaries the model of soldiers and men of honour, and denominated *The knight without fear and without reproach*, was descended from an ancient and noble family in Dauphiné. He was with Charles VIII. at the conquest of the kingdom of Naples; where he gave remarkable proofs of his valour, especially at the battle of Fornoue. He was dangerously wounded at the taking of the city of Brescia; and there restored to the daughters of his host 2000 pistoles, which their mother had directed them to give him in order to prevent the house from being plundered: an action that has been celebrated by many historians. At his return to France, he was made lieutenant-general of Dauphiné. He fought by the side of Francis I. at the battle of Marignan; and that prince afterwards insisted on being knighted by his hand, after the manner of the ancient knights. The chevalier Bayard defended Meziens during six weeks, against Charles V.'s army. In 1524,

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at the retreat of Rebec † (the general Bonivet having been wounded and obliged to quit the field), the conduct of the rear was committed to the chevalier Bayard, who, though so much a stranger to the arts of a court that he never rose to the chief command, was always called, in times of real danger, to the posts of greatest difficulty and importance. He put himself at the head of the men at arms; and animating them by his presence and example to sustain the whole flock of the enemy's troops, he gained time for the rest of his countrymen to make good their retreat. But in this service he received a wound which he immediately perceived to be mortal; and being unable to continue any longer on horseback, he ordered one of his attendants to place him under a tree, with his face towards the enemy: then fixing his eyes on the guard of his sword, which he held up instead of a cross, he addressed his prayers to God; and in this posture, which became his character both as a soldier and as a Christian, he calmly waited the approach of death. Bourbon, who led the foremost of the enemy's troops, found him in this situation, and expressed regret and pity at the sight. "Pity not me," cried the high-spirited chevalier, "I die as a man of honour ought, in the discharge of my duty: they indeed are objects of pity, who fight 'gainst their king, their country, and their oath." The marquis de Pescara, passing soon after, manifested his admiration of Bayard's virtue, as well as his sorrow for his fate, with the generosity of a gallant enemy; and finding that he could not be removed with safety from that spot, ordered a tent to be pitched there, and appointed proper persons to attend him. He died, notwithstanding their care, as his ancestors for several generations had done, in the field of battle. Pescara ordered his body to be embalmed, and sent to his relations; and such was the respect paid to military merit in that age, that the duke of Savoy commanded it to be received with royal honours in all the cities of his dominions: in Dauphiné, Bayard's native country, the people of all ranks came out in a solemn procession to meet it.

BAYEUX, a considerable town of France in Normandy, and capital of Bessin, with a rich bishop's see. The cathedral church is accounted the finest in that province; and its front and three high steeples are said to be the best in France. W. Long. o. 33. N. Lat. 49. 16.

BAYLE (Peter), author of the Historical and Critical Dictionary, was born November 18. 1657, at Carla, a village in the county of Foix, in France, where his father John Bayle was a Protestant minister. In 1666, he went to the Protestant university at Puy-lauroux, where he studied with the greatest application; and in 1669, removed to the university of Toulouse, whither the Protestants at that time frequently sent their children to study under the Jesuits: but here, to the great grief of his father, he embraced the Romish religion; however, being soon sensible of his error, he left that university, and went to study at Geneva. After which he was chosen professor of philosophy at Sedan: but that Protestant university being suppressed by Lewis XIV. in 1681, he was obliged to leave the city; and was soon after chosen professor of philosophy and history at Rotterdam, with a salary of about 45 l. a year. The year following he published

his Letter concerning Comets. And Father Maimbourg having published about this time his History of Calvinism, wherein he endeavours to draw upon the Protestants the contempt and resentment of the Catholics, Mr Bayle wrote a piece to confute his history.

The reputation which he had now acquired, induced the States of Friesland, in 1684, to offer him a professorship in their university; but he wrote them a letter of thanks, and declined the offer. This same year he began to publish his *Nouvelles de la republique des lettres*.

In 1686, he was drawn into a dispute in relation to the famous Christina queen of Sweden. In his Journal for April, he took notice of a printed letter, supposed to have been written by her Swedish majesty to the chevalier de Terlon, wherein she condemns the persecution of the Protestants in France. He inserted the letter itself in his Journal for May, and in that of June following he says, "What we hinted at in our last month, is confirmed to us from day to day, that Christina is the real author of the letter concerning the persecutions in France, which is ascribed to her: it is a remainder of Protestantism." Mr Bayle received an anonymous letter, the author of which says, that he wrote to him of his own accord, being in duty bound to it, as a servant of the queen. He complains that Mr Bayle, speaking of her majesty, called her only *Christina*, without any title; he finds also great fault with his calling the letter "a remainder of Protestantism." He blames him likewise for inserting the words "I am," in the conclusion of the letter. "These words (says this anonymous writer) are not her majesty's; a queen, as she is, cannot employ these words but with regard to a very few persons, and Mr de Terlon is not of that number." Mr Bayle wrote a vindication of himself as to these particulars; with which the author of the anonymous letter declared himself satisfied, excepting what related to "the remainder of Protestantism." He would not admit of the defence with regard to that expression; and, in another letter, advised him to retract that expression. He adds in a postscript, "You mention, in your Journal of August, a second letter of the queen, which you scruple to publish. Her majesty would be glad to see that letter, and you will do a thing agreeable to her if you would send it to her. You might take this opportunity of writing to her majesty. This counsel may be of some use to you; do not neglect it." Mr Bayle took the hint, and wrote a letter to her majesty, dated the 14th of November 1686; to which the queen, on the 14th of December, wrote the following answer:

"Mr Bayle, I have received your excuses; and am willing you should know by this letter, that I am satisfied with them. I am obliged to the zeal of the person who gave you occasion of writing to me; for I am very glad to know you. You express so much respect and affection for me, that I pardon you sincerely; and I would have you know, that nothing gave me offence but that *remainder of Protestantism*, of which you accused me. I am very delicate on that head, because no body can suspect me of it, without lessening my glory, and injuring me in the most sensible manner. You would do well, if you should even acquaint the public with the mistake you have made, and with your regret for it. This is all that remains to be done by you,

you,

Bayle.

you, in order to deserve my being entirely satisfied with you. As to the letter which you have sent me, it is mine without doubt; and since you tell me that it is printed, you will do me a pleasure if you send me some copies of it. As I fear nothing in France, so neither do I fear any thing at Rome. My fortune, my blood, and even my life, are entirely devoted to the service of the church; but I flatter nobody, and will never speak any thing but the truth. I am obliged to those who have been pleased to publish my letter, for I do not at all disguise my sentiments. I thank God, they are too noble and too honourable to be disowned. However, it is not true that this letter was written to one of my ministers. As I have every where enemies, and persons who envy me, so in all places I have friends and servants: and I have possibly as many in France, notwithstanding of the court, as any where in the world. This is purely the truth, and you may regulate yourself accordingly. But you shall not get off so cheap as you imagine. I will enjoin you a penance; which is, that you will henceforth take the trouble of sending me all curious books that shall be published in Latin, French, Spanish, or Italian, on whatever subject or science, provided they are worthy of being looked into; I do not even except romances or satires: and above all, if there are any books of chemistry, I desire you may send them to me as soon as possible. Do not forget likewise to send me your Journal. I shall order that you be paid for whatever you lay out, do but send me an account of it. This will be the most agreeable and most important service that can be done me. May God prosper you.

CHRISTINA ALEXANDRA."

It now only remained that Mr Bayle should acquaint the public with the mistake he had made, in order to merit that prince's entire satisfaction; and this he did in the beginning of his Journal of the month of January, 1687.

The persecution which the Protestants at this time suffered in France affected Mr Bayle extremely. He made occasionally some reflections on their sufferings in his Journal; and he wrote a pamphlet also on the subject. Some time afterward he published his *Commentaire Philosophique* upon these words, "Compel them to come in:" but the great application he gave to this and his other works, threw him into a fit of sickness, which obliged him to discontinue his Literary Journal. Being advised to try a change of air, he left Rotterdam on the 8th of August, and went to Cleves; whence, after having continued some time, he removed to Aix la Chapelle, and from thence returned to Rotterdam on the 18th of October. In the year 1690, the famous book entitled, *Avis aux Réfugiés*, &c. made its appearance. Mr Jurieu, who took Mr Bayle for the author thereof, wrote a piece against it; and he prefixed an advice to the public, wherein he calls Mr Bayle a profane person, and a traitor engaged in a conspiracy against the state. As soon as Mr Bayle had read this libel against him, he went to the grand Schout of Rotterdam, and offered to go to prison, provided his accuser would accompany him, and undergo the punishment he deserved if the accusation was found unjust. He published also an answer to Mr Jurieu's charge; and as his reputation, nay his very life, was at stake in case the accusation of treason was proved, he therefore thought himself not obliged to keep any terms with

his accuser, and attacked him with the utmost severity. Mr Jurieu lost all patience: he applied himself to the magistrates of Amsterdam; who advised him to a reconciliation with Mr Bayle, and enjoined them not to publish any thing against each other till it was examined by Mr Boyer, the pensioner of Rotterdam. But notwithstanding this prohibition, Mr Jurieu attacked Mr Bayle again with so much passion, that he forced him to write a new vindication of himself.

In November 1690, Mr de Beauval advertised in his Journal *A scheme for a Critical Dictionary*. This was the work of Mr Bayle. The articles of the three first letters of the alphabet were already prepared; but a dispute happening betwixt him and Mr de Beauval, obliged him for some time to lay aside the work. Nor did he resume it till May 1692, when he published his scheme: but the public not approving of his plan, he threw it into a different form; and the first volume was published in August 1695, and the second in October following. The work was extremely well received by the public; but it engaged him in fresh disputes, particularly with Mr Jurieu and the abbe Renaudot. Mr Jurieu published a piece, wherein he endeavoured to engage the ecclesiastical assemblies to condemn the dictionary; he presented it to the senate sitting at Delft, but they took no notice of the affair. The consistory of Rotterdam granted Mr Bayle a hearing; and after having heard his answers to their remarks on his dictionary, declared themselves satisfied, and advised him to communicate this to the public. Mr Jurieu made another attempt with the consistory in 1698; and so far he prevailed with them, that they exhorted Mr Bayle to be more cautious with regard to his principles in the second edition of his dictionary; which was published in 1702, with many additions and improvements.

Mr Bayle was a most laborious and indefatigable writer. In one of his letters to Maizeaux, he says, that since his 20th year he hardly remembers to have had any leisure. His intense application contributed perhaps to impair his constitution, for it soon began to decline. He had a decay of the lungs, which weakened him considerably; and as this was a distemper which had cut off several of his family, he judged it to be mortal, and would take no remedies. He died the 28th of December 1706, after he had been writing the greatest part of the day. He wrote several books besides what we have mentioned, many of which were in his own defence against attacks he had received from the abbe Renaudot, Mr Clerc, M. Jaquelot, and others. Among the productions which do honour to the age of Lewis XIV. Mr Voltaire has not omitted the Critical Dictionary of our author: "It is the first work of the kind (he says) in which a man may learn to think." He censures indeed those articles, which contain only a detail of minute facts, as unworthy either of Bale, an understanding reader, or posterity. "In placing him (continues the same author) amongst the writers who do honour to the age of Lewis XIV. notwithstanding his being a refugee in Holland, I only conform to the decree of the parliament of Tholouse, which, when it declared his will valid in France, notwithstanding the rigour of the laws, expressly said, *that such a man could not be considered as a foreigner.*"

BAYON, a town of France, in Lorrain, seated on the

the river Mofelle. E. Long. 14. 42. N. Lat. 48. 30.
 BAYON, or *Bayona*, a town of Galicia, in Spain, seated on a small gulph of the Atlantic ocean, about 12 miles from Tuy. It has a very commodious harbour, and the country about it is fertile. W. Long. 9. 30. N. Lat. 43. 3.

BAYONET, in the military art, a short broad dagger, formerly with a round handle fitted for the bore of a firelock, to be fixed there after the soldier had fired; but they are now made with iron handles and rings, that go over the muzzle of the firelock, and are screwed fast, so that the soldier fires with his bayonet on the muzzle of his piece, and is ready to act against the horse. This use of the bayonet fastened on the muzzle of the firelock was a great improvement, first introduced by the French, and to which, according to M. Folard, they owed a great part of their victories in the last century; and to the neglect of this in the next succeeding war, and trusting to their fire, the same author attributes most of the losses they sustained. At the siege of Malta, a weapon called *pila ignea* was contrived to oppose the bayonets, being in some measure the converse thereof; as the latter consists of a dagger added to a fire-arm, the former consisted of a fire-arm added to a pilum or pike.

BAYONNE, a city of Gascony, in France; seated near the mouth of the river Adour, which forms a good harbour. It is moderately large, and of great importance. It is divided into three parts. The great town is on this side the river Nive: the little town is between the Nive and the Adour; and the suburbs of Saint Esprit is beyond this last river. Both the former are surrounded with an old wall and a dry ditch, and there is a small castle in each. That of Great Bayonne is flanked with four round towers, and is the place where the governor resides. The new castle is flanked with four towers, in the form of bastions. The first inclosure is covered with another, composed of eight bastions, with a great horn-work, and a half moon; all which are encompassed with a ditch, and a covered way. There is a communication between the city and the suburbs by a bridge, and the suburbs is well fortified. The citadel is seated beyond the Adour, on the side of the suburbs abovementioned. The public buildings have nothing remarkable; it is the only city in the kingdom that has the advantage of two rivers, wherein the tide ebbs and flows. The river Nive is deeper than the Adour, but less rapid, by which means ships come up into the middle of the city. There are two bridges over this river, by which the old and new town communicate with each other. The trade of this town is the more considerable, on account of its neighbourhood to Spain, and the great quantity of wines which are brought hither from the adjacent country. The Dutch carry off a great number of pipes in exchange for spices and other commodities, which they bring thither. The inhabitants have the privilege of guarding two of their three gates, and the third is kept by the king. W. Long. 1. 20. N. Lat. 43. 20.

BAYS, in commerce, a sort of open woollen stuff, having a long nap, sometimes frized, and sometimes not. This stuff is without wale; and is wrought in a loom with two treddles, like flannel. It is chiefly manufactured at Colchester and Bockin in Essex, where there is a hall called the *Dutch-bay hall* or *raw-hall*.

This manufacture was first introduced into England, with that of fays, farges, &c. by the Flemings; who, being persecuted by the duke of Alva for their religion, fled thither about the fifth of Queen Elizabeth's reign; and had afterwards peculiar privileges granted them by act of parliament 12 Charles II. 1660, which the bays-makers in the above places still enjoy.—The exportation of bays was formerly much more considerable than at present when the French have learned to imitate them. However, the English bays are still sent in great quantities to Spain and Portugal, and even to Italy. Their chief use is for dressing the monks and nuns, and for linings, especially in the army. The looking-glass makers also use them behind their glasses, to preserve the tin or quicksilver; and the case-makers, to line their cases. The breadth of bays is commonly a yard and a half, a yard and three quarters, or two yards, by 42 to 48 in length. Those of a yard and three quarters are most proper for the Spanish trade.

BAZADOIS, a province of Guienne in France, which makes part of Lower Gascony. It is a barren heathy country. Its capital is Bazas.

BAZAR, or BASAR, a denomination among the Turks and Persians, given to a kind of exchanges, or places where their finest stuffs and other wares are sold. These are also called *bezestins*. The word *bazar* seems of Arabic origin, where it denotes sale, or exchange of goods. Some of the eastern bazars are open, like the market-places in Europe, and serve for the same uses, more particularly for the sale of the bulky and less valuable commodities. Others are covered with lofty ceilings, or even domes, pierced to give light; and it is in these the jewelers, goldsmiths, and other dealers in the richer wares, have their shops. The bazar or maidan of Ispahan, is one of the finest places in Persia, and even surpasses all the exchanges in Europe; yet, notwithstanding its magnificence, it is excelled by the bazar of Tauris, which is the largest that is known, having several times held 30,000 men ranged in order of battle. At Constantinople, there is the old and the new bazar, which are large square buildings, covered with domes, and sustained by arches and pilasters; the former chiefly for arms, harnesses, and the like: the latter for goldsmiths, jewelers, furriers, and all sorts of manufacturers.

BAZAS, a town of Guienne in France, capital of the Bazadois, with a bishop's see. It is built on a rock, in W. Long. 0. 30. N. Lat. 44. 20.

BAZAT, or BAZA, in commerce, a long, fine, spun cotton, which comes from Jerusalem, whence it is also called *Jerusalem-cotton*.

BAZGENGES, in natural history, the name of a substance used by the Turks, and other eastern nations, in their scarlet-dying: they mix it for this purpose with cochineal and tartar, the proportions being two ounces of the bazgendes to one ounce of cochineal. These are generally esteemed a sort of fruit, and are produced on certain trees in Syria and other places; and it is usually supposed, that the scarcity and dearthness of them is the only thing that makes them not used in Europe. But the bazgendes seem to be no other than the horns of the turpentine-tree in the eastern parts of the world; and it is not only in Syria that they are found, but China also affords them. Many things of

Bazadois
 Bazgen-
 ges.

Edellium
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Beacon.

this kind* were sent over to Mr Geoffroy at Paris from China, as the substances used in the scarlet-dying of that country, and they all proved wholly the same with the Syrian and Turkish bazgendges, and with the common turpentine horns. The lentisk, or mastic-tree, is also frequently found producing many horns of a like kind with these, and of the same origin, all being owing to the pucerons, which make their way into the leaves, to breed their young there.

BDELLIUM, a gummy resinous juice, produced by a tree in the East Indies, of which we have no satisfactory account. It is brought into Europe both from the East Indies and Arabia. It is in pieces of different sizes and figures, externally of a dark reddish brown, somewhat like myrrh; internally it is clear, and not unlike to glue; to the taste it is slightly bitterish and pungent; its odour is very agreeable. If held in the mouth, it soon becomes soft and tenacious, sticking to the teeth. Laid on a red-hot iron, it readily catches flame, and burns with a crackling noise, and, in proportion to its goodness, it is more or less fragrant. Near half of its substance dissolves either in water or in spirit of wine; but the tincture made with spirit is somewhat stronger, and by much more agreeable. Vinegar, or verjuice, dissolves it wholly. The simple gum is a better medicine than any preparation from it. It is one the weakest of the coadjuvant gums, but it is used as a pectoral and an emmenagogue.

BEACHY-HEAD, a promontory on the coast of Sussex, between Hastings and Shoreham, where the French defeated the English and Dutch fleet in 1690.

BEACON, a signal for the better securing the kingdom from foreign invasions. See SIGNAL.

On certain eminent places of the country are placed long poles erected, whereon are fastened pitch-barrels to be fired by night, and smoke made by day, to give notice in a few hours to the whole kingdom of an approaching invasion. These are commonly called *beacons*; whence also comes *beaconage**.—We find beacons familiarly in use among the primitive Britons and Western Highlanders. The besieged capital of one of our northern isles, in the third century, actually lighted up a fire upon a tower; and Fingal instantly knew “the green flame edged with smoke” to be a token of attack and distress†. And there are to this day several cairns or heaps of stones upon the heights along the coasts of the Harries, on which the inhabitants used to burn heath as a signal of an approaching enemy.

BEACONS are also marks and signs erected on the coasts, for guiding and preserving vessels at sea, by night as well as by day.

The erection of beacons, light-houses, and sea-marks, is a branch of the royal prerogative. The king hath the exclusive power, by commission under his great seal, to cause them to be erected in fit and convenient places, as well upon the lands of the subject as upon the demesnes of the crown: which power is usually vested by letters patent in the office of lord high admiral. And by statute 8 Eliz. c. 13, the corporation of the trinity-house are empowered to set up any beacons or sea-marks wherever they shall think them necessary; and if the owner of the land or any other person shall destroy them, or shall take down any steeple, tree, or other known sea-mark, he shall forfeit 100*l.* or, in case of inability to pay it, shall be *ipso facto* outlawed.

BEACONAGE, money paid towards the maintenance of a beacon*.—The word is derived from the Saxon *beacnian*, to nod, or shew by a sign: hence also the word *beckon*.

BEACONSFIELD, a town of Buckinghamshire in England, seated on a hill in the road between London and Oxford. It has several good inns, though not above 100 houses. W. Long. o. 25. N. Lat. 51. 36.

BEAD, a small glass ball, made in imitation of pearl, and used in necklaces, &c.—The Romanists make great use of beads in rehearsing their *Ave-Marias* and *Pater-nosters*; and the like usage is found among the dervises and other religious throughout the East, as well Mahometan as Heathen. The ancient druids appear also to have had their beads, many of which are still found; at least, in the conjecture of an ingenious author may be admitted, who takes those antique glass globules, having a snake painted round them, and called *adder-beads*, or *snake-buttons*, to have been the beads of our ancient British druids. See ANGUIS.

BEAD, in architecture, a round moulding, commonly made upon the edge of a piece of stuff, in the Corinthian and Roman orders, cut or carved in short embossments, like beads in necklaces.

BEAD-MAKERS, called by the French *paternostriers*, are those employed in the making, stringing, and selling of beads. At Paris there are three companies of paternostriers, or bead-makers; one who make them of glass or crystal; another in wood and horn; and the third in amber, coral, jet, &c.

BEAD-PROOF, a term used by our distillers, to express that sort of proof of the standard strength of spirituous liquors, which consists in their having, when shaken in a phial, or poured from on high into a glass, a crown of bubbles, which stand on the surface some time after. This is esteemed a proof that the spirit consists of equal parts of rectified spirits and phlegm.—This is a fallacious rule as to the degree of strength in the goods; because any thing that will increase the tenacity of the spirit, will give it this proof, though it be under the due strength. Our malt-distillers spoil the greater part of their goods, by leaving too much of the stinking oil of the malt in their spirit, in order to give it this proof when somewhat under the standard strength. But this is a great deceit on the purchasers of malt spirits, as they have them by this means not only weaker than they ought to be, but stinking with an oil that they are not easily cleared of afterwards. On the other hand, the dealers in brandy, who usually have the art of sophisticating it to a great nicety, are in the right when they buy it by the strongest bead-proof, as the grand mark of the bell; for being a proof of the brandy containing a large quantity of its oil, it is, at the same time, a token of its high flavour, and of its being capable of bearing a very large addition of the common spirits of our own produce, without betraying their flavour, or losing its own. We value the French brandy for the quantity of this essential oil of the grape which it contains; and that with good reason, as it is with us principally used for drinking as an agreeably flavoured cordial: but the French themselves, when they want it for any curious purposes, are as careful in the rectifications of it, and take as much pains to clear it from this oil, as we do to free our malt spirit from that nauseous and fetid oil which it originally contains.

BEAD-

* See Beaconage.

† Cfian, Vol. I, p. 198.

Beacon
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Bea-
* See Z
con.

cod
||
am.

BEAD-Roll, among Papists, a list of such persons, for the rest of whose souls they are obliged to repeat a certain number of prayers, which they count by means of their beads.

BEADLE, (from the Saxon *bydel*, a messenger), a crier or messenger of a court, who cites persons to appear and answer. Called also a *summoner* or *apparitor*. — *Beadle* is also an officer at an university, whose chief business is to walk before the masters with a mace, at all public processions. — There are also *church-beadles*, whose office is well known.

BEAGLES, a small sort of hounds or hunting dogs. Beagles are of divers kinds; as the *southern beagle*, something less and shorter, but thicker, than the deep-mouthed hound; the *fleet northern* or *cat beagle*, smaller, and of a finer shape than the southern, and a harder runner. From the two, by crossing the strains, is bred a third sort held preferable to either. To these may be added a still smaller sort of beagles, scarce bigger than lap-dogs, which make pretty diversion in hunting the coney, or even small hare in dry weather; but otherwise unserviceable, by reason of their size.

BEAK, the bill or nib of a bird *.

BEAK, or Beak-head, of a ship, that part without the ship, before the fore-castle, which is fastened to the stem, and is supported by the main knee.

The beak, called by the Greeks *εμβοα*, by the Latins *rostrum*, was an important part in the ancient ships of war, which were hence denominated *naves rostratae*. The beak was made of wood; but fortified with brass, and fastened to the prow, serving to annoy the enemies vessels. Its invention is attributed to Piseus an Italian. The first beaks were made long and high; but afterwards a Corinthian, named *Aristo*, contrived to make them short and strong, and placed so low, as to pierce the enemies vessels under water. By the help of these great havock was made by the Syraculians in the Athenian fleet.

BEAKED, in heraldry, a term used to express the beak or bill of a bird. When the beak and legs of a fowl are of a different tincture from the body, we say *beaked and membered of such a tincture*.

BEALE (Mary), particularly distinguished by her skill in painting, was the daughter of Mr Craddock, minister of Waltham upon Thames, and learned the rudiments of her art from Sir Peter Lely. She painted in oil, water-colours, and crayons, and had much business; her portraits were in the Italian style, which she acquired by copying pictures and drawings from Sir Peter Lely's and the royal collections. Her master, says Mr Walpole, was supposed to have had a tender attachment to her; but as he was reserved in communicating to her all the resources of his pencil, it probably was a gallant rather than a successful one. Dr Woodfall wrote several pieces to her honour, under the name of *Belesia*. Mrs Beale died in Pall-mall, on the 28th of December, 1697, aged 65. Her paintings have much nature, but the colouring is stiff and heavy.

BEALT, BEALTH, or Build, a town of Brecknockshire in South Wales, pleasantly seated on the river Wye. It consists of about 100 houses, whose inhabitants have a trade in stockings. W. Long. 4. 10. N. Lat. 52. 4.

BEAM, in architecture, the largest piece of wood in a building, which lies cross the walls, and serves to

support the principal rafters of the roof, and into which the feet of these rafters are framed. No building has less than two of these beams, viz. one at each end; and into these the girders of the garret roof are also framed. The proportion of beams in or near London, are fixed by statute, as follows: a beam 15 feet long, must be 7 inches on one side its square, and 5 on the other; if it be 16 feet long, one side must be 8 inches, the other 6, and so proportionably to their lengths. In the country, where wood is more plenty, they usually make their beams stronger.

BEAMS of a Ship are the great main cross-timbers which hold the sides of the ship from falling together, and which also support the decks and orlops: the main beam is next the main-mast, and from it they are reckoned by first, second, third beam, &c. the greatest beam of all is called the *midship beam*.

BEAM-Compass, an instrument consisting of a square wooden or brass beam, having sliding sockets, that carry steel or pencil points; they are used for describing large circles, where the common compasses are useless.

BEAM-Bird, or *Petty-chap*. See *MOTACILLA*.

BEAM also denotes the lath, or iron, of a pair of scales; sometimes the whole apparatus for weighing of goods is so called: Thus we say, it weighs so much at the king's beam.

BEAM of a Plough, that in which all the parts of the plough-tail are fixed *.

BEAM, or Roller, among weavers, a long and thick wooden cylinder, placed lengthwise on the back-part of the loom of those who work with a shuttle. That cylinder, on which the stuff is rolled as it is weaved, is also called the *beam* or *roller*, and is placed on the fore-part of the loom.

BEAMINSTER, a town of Dorsetshire in England, seated on the river Bert, in W. Long. 2. 50. N. Lat. 52. 45.

BEAN, in botany. See *VICIA*.

The ancients made use of beans in gathering the votes of the people, and for the election of magistrates. A white bean signified *absolution*, and a black one *condemnation*. Beans had a mysterious use in the *lenuralia* and *parentalia*; where the master of the family, after washing, was to throw a sort of black beans over his head, still repeating the words, 'I redeem myself and family by these beans.' Ovid† gives a lively description of the whole ceremony in verse. — *Fast. lib. 5. v. 435.* Abstinence from beans was enjoined by Pythagoras, one of whose symbols is, *καμην ἀνιχιδαν, abstine a fabis*. The Egyptian priests held it a crime to look at beans, judging the very sight unclean. The *flamen dialis* was not permitted even to mention the name. The precept of Pythagoras has been variously interpreted: some understand it of forbearing to meddle in trials and verdicts, which were then by throwing beans into an urn; others, building on the equivocal of the word *καμην*, which equally signifies a *bean* and a *human testicle*, explain it by abstaining from venery. Clemens Alexandrinus grounds the abstinence from beans on this, that they render women barren; which is confirmed by Theophrastus, who extends the effect even to plants. Cicero suggests another reason for this abstinence, viz. that beans are great enemies to tranquillity of mind. For a reason of this kind it is, that Amphiraus is said to have abstained from beans, even before Pythagoras,

Beam
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Beam.

* See
Plough; and
Agriculture,
no 78, &c.

† *Fast. lib. 5. v. 435.*

Beans
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Beard.

that he might enjoy a clearer divination by dreams.

BEANS, as food for horses. See FARRIERY, § i. 6.

BEAN-Cod, a small fishing vessel, or pilot-boat, common on the sea-coasts and in the rivers of Portugal. It is extremely sharp forward, having its stem bent inward above into a great curve: the stem is also plated on the fore-side with iron, into which a number of bolts are driven, to fortify it, and resist the stroke of another vessel, which may fall athwart-haue. It is commonly navigated with a large lateen sail, which extends over the whole length of the deck, and is accordingly well fitted to ply to windward.

BEAN-Flour, called by the Romans *lomentum*, was of some repute among the ancient ladies as a cosmetic, wherewith to smooth the skin, and take away wrinkles.

BEAN-Fly, in natural history, the name given by authors to a very beautiful fly, of a pale purple colour, frequently found on bean-flowers. It is produced from the worm or maggot called by authors *mida*.

BEAN-Goose, in ornithology. See ANAS.

KIDNEY-BEAN. See PHASEOLUS.

BEAR, in zoology. See URSUS.

BEAR, in astronomy. See URSA.

Order of the BEAR was a military order in Switzerland, erected by the emperor Frederick II. in 1213, by way of acknowledgement for the service the Swis had done him, and in favour of the abbey of St Gaul. To the collar of the order hung a medal, on which was represented a bear raised on an eminence of earth.

BEAR'S-BREECH, in botany. See ACANTHUS.

BEAR'S FLESH was much esteemed by the ancients: even at this day, the paw of a bear salted and smoked is served up at the table of princes.

BEAR'S GREASE, was formerly esteemed a sovereign remedy against cold disorders, especially rheumatisms.

BEAR'S SKIN makes a fur in great esteem, and on which depends a considerable article of commerce, being used in housings, on coach-boxes, &c. In some countries, clothes are made of it, more especially bags wherein to keep the feet warm in severe colds. Of the skins of bears cubs are made gloves, muffs, and the like.

BEARALSTON, a poor town of Devonshire, which, however, is a borough by prescription, and sends two members to parliament.

* See HAIR.

BEARD, the hair growing on the chin, and adjacent parts of the face, chiefly of adults and males *. Various have been the ceremonies and customs of most nations in regard of the beard. The Tartars, out of a religious principle, waged a long and bloody war with the Persians, declaring them infidels, merely because they would not cut their whiskers, after the rite of Tartary: and we find, that a considerable branch of the religion of the ancients, consisted in the management of their beard. The Greeks wore their beards till the time of Alexander the Great; that prince having ordered the Macedonians to be shaved, for fear it should give a handle to their enemies. According to Pliny, the Romans did not begin to shave till the year of Rome 454, when P. Ticinius brought over a stock of barbers from Sicily.—Persons of quality had their children shaved the first time by others of the same or greater quality, who, by this means, became god-father, or adoptive father of the children. Anciently, indeed, a person became god-father of the child by

barely touching his beard: thus historians relate, that one of the articles of the treaty between Alaric and Clovis was, that Alaric should touch the beard of Clovis to become his god-father.

As to ecclesiastics, the discipline has been very different on the article of beards: sometimes they have been enjoined to wear them, from a notion of too much effeminacy in shaving, and that a long beard was more suitable to the ecclesiastical gravity; and sometimes again they were forbid it, as imagining pride to lurk beneath a venerable beard. The Greek and Roman churches have been long together by the ears about their beards: since the time of their separation, the Romanists seem to have given more into the practice of shaving, by way of opposition to the Greeks; and have even made some express constitutions *de radendis barbis*. The Greeks, on the contrary, espouse very zealously the cause of long beards, and are extremely scandalized at the beardless images of saints in the Roman churches. By the statues of some monasteries it appears, that the lay-monks were to let their beards grow, and the priests among them to shave; and that the beards of all that were received into the monasteries, were blessed with a great deal of ceremony. There are still extant the prayers used in the solemnity of consecrating the beard to God, when an ecclesiastic was shaven.

Le Comte observes, that the Chinese affect long beards extravagantly; but nature has balked them, and only given them very little ones, which, however, they cultivate with infinite care: the Europeans are strangely envied by them on this account, and esteemed the greatest men in the world. The Russians wore their beards till within this half century, when Peter the Great enjoined them all to shave; but notwithstanding his injunction, he was obliged to keep on foot a number of officers to cut off by violence the beards of such as would not otherwise part with them. Chrysostom observes, that the kings of Persia had their beards wove or matted together with gold-thread; and some of the first kings of France had their beards knotted and buttoned with gold.

Among the Franks, shaving or mutilating the beard was the greatest affront that could be offered any person. Taking away a single hair was an injury scarce to be forgiven. Among the Turks, it is more infamous for any one to have his beard cut off, than among us to be publicly whipt, or branded with a hot iron. There are abundance in that country, who would prefer death to this kind of punishment. The Arabs make the preservation of their beards a capital point of religion, because Mahomet never cut his. Hence the razor is never drawn over the Grand Signior's face. The Persians, who clip them, and shave above the jaw, are reputed heretics. It is likewise a mark of authority and liberty among them, as well as among the Turks. They who serve in the seraglio, have their beards shaven, as a sign of their servitude. They do not suffer it to grow till the sultan has set them at liberty, which is bestowed as a reward upon them, and is always accompanied with some employment.

Consecration of the BEARD was a ceremony among the Roman youth, who, when they were shaved the first time, kept a day of rejoicing, and were particularly careful to put the hair of their beard into a silver or gold box, and make an offering of it to some god, par-

Beard.

1.
ed.

particularly to Jupiter Capitolinus, as was done by Nero, according to Suetonius.

Kissing the BEARD. The Turkish wives kiss their husbands beards, and children their fathers, as often as they come to salute them. The men kiss one another's beards reciprocally on both sides, when they salute in the streets, or come off from any journey.

The Fashion of the BEARD has varied in different ages and countries; some cultivating and entertaining one part of it, some another. Thus the Hebrews wear a beard on their chin; but not on the upper-lip or cheeks. Moses forbids them to cut off entirely the angle or extremity of their beard; that is, to manage it after the Egyptian fashion, who left only a little tuft of beard at the extremity of their chin; whereas the Jews to this day suffer a little fillet of hair to grow from the lower end of their ears to their chins, where, as well as on their lower-lips, their beards are in a pretty long bunch. The Jews, in time of mourning, neglected to trim their beards, that is, to cut off what grew superfluous on the upper-lips and cheeks. In time of grief and great affliction, they also plucked off the hair of their beards.

Anointing the BEARD with unguents is an ancient practice both among the Jews and Romans, and still continues in use among the Turks; where one of the principal ceremonies observed in serious visits is to throw sweet-scented water on the beards of the visitor, and to perfume it afterwards with aloes-wood, which sticks to this moisture, and gives it an agreeable smell, &c. In middle-age writers we meet with *adlentare barbans*, used for stroking and combing it, to render it soft and flexible. The Turks, when they comb their beards, hold a hankerchief on their knees, and gather very carefully the hairs that fall; and when they have got together a certain quantity, they fold them up in paper, and carry them to the place where they bury the dead.

BEARD of a Comet, the rays which the comet emits towards that part of the heaven to which its proper motion seems to direct it; in which the beard of a comet is distinguished from the tail, which is understood of the rays emitted towards that part from whence its motion seems to carry it.

BEARD of a Horse, that part underneath the lower mandible on the outside and above the chin, which bears the curb. It is also called the *chuck*. It should have but little flesh upon it, without any chops, hardness, or swelling; and be neither too high raised nor too flat, but such as the curb may rest in its right place.

BEARD of a Muscle, oyster, or the like, denotes an assemblage of threads or hairs, by which those animals fasten themselves to stones. The hairs of this beard terminate in a flat spongy substance, which being applied to the surface of a stone, sticks thereto, like the wet leather used by boys.

BEARDS, in the history of insects, are two small, oblong, fleshy bodies, placed just above the trunk, as in the gnats, and in the moths and butterflies.

BEARDED, denotes a person or thing with a beard, or some resemblance thereof. The faces on ancient Greek and Roman medals are generally bearded. Some are denominated *pogonati*, as having long beards, e. gr. the Parthian kings. Others have only a lanugo about the chin, as the Seleucid family. Adrian was the first

of the Roman emperors who nourished his beard: hence all imperial medals before him are beardless; after him, *bearded*.

BEARDED Women have been all observed to want the menstrual discharge; and several instances are given by Hippocrates, and other physicians, of grown women, especially widows, in whom the menses coming to stop, beards appeared. Eusebius Nierembergius mentions a woman who had a beard reaching to her navel.

BEARERS, in heraldry. See *SUPPORTERS*.

BEARING, in navigation, an arch of the horizon intercepted between the nearest meridian and any distinct object, either discovered by the eye, or resulting from the finical proportion; as in the first case, at 4 P. M. Cape Spado, in the isle of Candia, bore S. by W. by the compass. In the second, the longitudes and latitudes of any two places being given, and consequently the difference of latitude and longitude between them, the bearing from one to the other is discovered by the following analogy:

As the meridional difference of latitude

Is to the difference of longitude;

So is radius

To the tangent bearing.

BEARING is also the situation of any distant object, estimated from some part of the ship according to her position. In this sense, an object to discovered, must be either ahead, astern, abreast on the bow, or on the quarter. These bearings, therefore, which may be called *mechanical*, are on the beam, before the beam, abast the beam, on the bow, on the quarter, ahead, or astern. If the ship sails with a side-wind, it alters the names of such bearings in some measure, since a distant object on the beam is then said to be to leeward or to windward; on the lee quarter or bow, and on the weather-quarter or bow.

BEARING, in the sea-language. When a ship sails towards the shore, before the wind, she is said to *bear in* with the land or harbour. To let the ship fail more before the wind, is to *bear up*. To put her right before the wind, is to *bear round*. A ship that keeps off from the land, is said to *bear off*. When a ship that was to windward comes under a ship's stern, and so gives her the wind, she is said to *bear under* her lee, &c. There is another sense of this word, in reference to the burden of a ship; for they say a ship *bears*, when, having too slender or lean a quarter, the ship will sink too deep into the water with an over light freight, and thereby can carry but a small quantity of goods.

BEARINGS, in heraldry, a term used to express a coat of arms, or the figures of armories by which the nobility and gentry are distinguished from the vulgar and from one another. See *HERALDRY*.

BEARN, a province of France, bounded on the east by Bigorre, on the south by the mountains of Aragon, on the west by Soule and part of Navarre, and on the north by Gascony and Armagnac. It lies at the foot of the Pyrenean mountains, being about 16 leagues in length, and 12 in breadth. In general it is but a barren country; yet the plains yield considerable quantities of flax, and a good quantity of Indian corn called *mailloc*. The mountains are rich in mines of iron, copper, and lead; some of them also are covered with vines, and others with pine trees; and they give rise to several mineral springs, and two

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considerable rivers, the one called the *Gave of Oleron*, and the other the *Gave of Beam*. Some wine is exported from this country; and the Spaniards buy up great numbers of the horses and cattle, together with most of their linen, of which there is a considerable manufactory. The principal places are Pau, Lescar, Ortez, Navarrens, Salles, and Oleron.

BEAST, in a general sense, an appellation given to all four-footed animals, fit either for food, labour, or sport.

BEASTS of *Burden*, in a commercial sense, all four-footed animals which serve to carry merchandizes on their backs. The beasts generally used for this purpose, are elephants, dromedaries, camels, horses, mules, asses, and the sheep of Mexico and Peru.

BEASTS of the *Chace* are five, viz. the buck, the doe, the fox, the roe, and the martin.

BEASTS and *Fowls of the Warren*, are the hare, the coney, the pheasant, and partridge.

BEASTS of the *Forest* are the hart, hind, hare, boar, and wolf.

BEAST, among gamesters, a game at cards, played in this manner: The best cards are the king, queen, &c. whereof they make three heaps, the king, the play, and triolet. Three, four, or five, may play; and to every one is dealt five cards. However, before the play begins, every one stakes to the three heaps. He that wins most tricks, takes up the heap called the *play*; he that hath the king, takes up the heap so called; and he that hath three of any fort, that is, three fours, three fives, three sixes, &c. takes up the triolet heap.

BEAT, in a general signification, signifies to chastise, strike, knock, or vanquish.

This word has several other significations in the manufatures, and in the arts and trades. Sometimes it signifies to forge and hammer, in which sense smiths and farriers say, to *beat iron*. Sometimes it means to pound, to reduce into powder: Thus we say, to *beat drugs*, to *beat pepper*, to *beat spices*; that is to say, to pulverize them.

BEAT of *Drum*, in the military art, is to give notice by beat of drum of a sudden danger; or, that scattered soldiers may repair to their arms and quarters, is to beat an alarm, or to arms. Also, to signify, by different manners of sounding a drum, that the soldiers are to fall on the enemy; to retreat before, in, or after, an attack; to move, or march, from one place to another; to permit the soldiers to come out of their quarters at break of day; to order to repair to their colours, &c.; is to beat a charge, a retreat, a march, &c.

BEAT (St), a town of France, in the county of Comminges, at the confluence of the Garonne and the Pique. It is seated between two mountains which are close to the town on each side. All the houses are built with marble, because they have no other materials. W. Long. 1. 6. N. Lat. 42. 50.

BEATIFICATION, an act by which the Pope declares a person beatified, or blessed, after his death. It is the first step towards canonization, or raising any one to the honour and dignity of a saint. No person can be beatified till 50 years after his or her death. All certificates or attestations of virtues and miracles, the necessary qualifications for sainthood, are examined by the congregation of rites. This examination often

continues for several years; after which his holiness decrees the beatification. The corpse and relics of the future saint are from thenceforth exposed to the veneration of all good Christians: his images are crowned with rays, and a particular office is set apart for him; but his body and relics are not carried in procession; indulgences likewise, and remission of sins, are granted on the day of his beatification; which though not so pompous as that of canonization, is however very splendid.

BEATING, or PULSATION, in medicine, the reciprocal agitation or palpitation of the heart or pulse.*

BEATING *Time*, in music, a method of measuring and marking the time for performers in concert, by a motion of the hand or foot up and down successively and in equal times. Knowing the true time of a crotchet, and supposing the measure actually subdivided into four crotchets, and the half measure into two, the hand or foot being up, if we put it down with the very beginning of the first note or crotchet, and then raise it with the third, and then down with the beginning of the next measure; this is called *beating* the time; and, by practice, a habit is acquired of making this motion very equal. Each down and up is sometimes called a *time*, or *measure*. The general rule is, to contrive the division of the measure so, that every down and up of the beating shall end with a particular note, on which very much depends the distinctness, and, as it were, the sense of the melody. Hence the beginning of every time, or beating, in the measure, is reckoned the accented part thereof.

Beating time is denoted, in the Italian music, by the term *à battuta*, which is usually put after what they call *recitativo*, where little or no time is observed, to denote, that here they are to begin again to mark or beat the time exactly.

The Romans aimed at somewhat of harmony in the strokes of their oars; and had an officer called *portifculus* in each galley, whose business was to beat time to the rowers, sometimes by a pole or mallet, and sometimes by his voice alone.

The ancients marked the rhyme in their musical compositions; but, to make it more observable in the practice, they beat the measure or time, and this in different manners. The most usual consisted in a motion of the foot, which was raised from, and struck alternately against, the ground, according to the modern method. Doing this was commonly the province of the master of the music, who was thence called *μετρητής* and *κορυφαίος*, because placed in the middle of the choir of musicians, and in an elevated situation, to be seen and heard more easily by the whole company. These beaters of measure were also called by the Greeks *ποδοκτύποι* and *ποδοφόροι*, because of the noise of their feet; and *συνισταριοι*, because of the uniformity or monotony of the rhyme. The Latins denominated them *pedarii*, *podarii*, and *pedicularii*. To make the beats or strokes more audible, their feet were generally shod with a sort of sandals either of wood or iron, called by the Greeks *κρουκίαι*, *κρουκαλα*, *κρουκία*, and by the Latins *pedicula*, *scabella*, or *scabilla*, because like to little stools or foot-stools. Sometimes they beat upon sonorous foot-stools, with the foot shod with a wooden or iron sole. They beat the measure not only with the foot, but also with the right-hand, all the fingers whereof they joined together,

gether, to strike into the hollow of the left. He who thus marked the rhythm, was called *manuductor*. The ancients also beat time or measure with shells, as oyster-shells, and bones of animals, which they struck against one another, much as the moderns now use castanets, and the like instruments. This the Greeks called *κρητα* *κρητα*, as is noted by Hesychius. The scholiast on Aristophanes speaks much to the same purpose. Other noisy instruments, as drums, cymbals, citterns, &c. were also used on the same occasion. They beat the measure generally in two equal or unequal times; at least, this holds of the usual rhythm of a piece of music, marked either by the noise of sandals, or the flapping of the hands. But the other rhythmic instruments last-mentioned, and which were used principally to excite and animate the dancers, marked the cadence after another manner; that is, the number of their percussions equalled, or even sometimes surpassed, that of the different sounds which composed the air or song played.

BEATING, with hunters, a term used of a flag, which runs first one way, and then another. He is then said to *beat up and down*.—The noise made by coues in rutting time is also called *beating* or *tapping*.

BEATING, in navigation, the operation of making a progress at sea against the direction of the wind, in a zig-zag line, or traverse, like that in which we ascend a steep hill. See **TACKLING**.

BEATITUDE, imports the supreme good, or the highest degree of happiness human nature is susceptible of; or the most perfect state of a rational being, wherein the soul has attained to the utmost excellency and dignity it is framed for. In which sense, it amounts to the same with what we otherwise call *blissfulness* and *sovereign felicity*; by the Greeks, *εὐδαιμονία*; and by the Latins, *summum bonum*, *beatitudo*, and *beatitas*.

BEATITUDE, among divines, denotes the beatific vision, or the fruition of God in a future life to all eternity.

BEATITUDE is also used in speaking of the thieves contained in Christ's sermon on the mount, whereby he pronounces blessed the poor in spirit, those that mourn, the meek, &c.

BEATON (David), archbishop of St Andrews, and a cardinal of Rome, in the early part of the 16th century, was born in 1494. Pope Paul III. raised him to the degree of a cardinal in December 1538; and being employed by James V. in negotiating his marriages with the court of France, he was there consecrated bishop of Mirepoix. Soon after his instalment as archbishop of St Andrews, he promoted a furious persecution of the reformers in Scotland; when the king's death put a stop, for a time, to his arbitrary proceedings, he being then excluded from affairs of government, and confined. He retired however to strong a party, that, upon the coronation of the young queen Mary, he was admitted of the council, made chancellor, and procured commission as legate *a latere* from the court of Rome. He now began to renew his persecution of heretics; and among the rest, of the famous Protestant preacher Mr George Wishart, whose sufferings at the stake the cardinal viewed from his window with apparent exultation. It is pretended, that Wishart at his death foretold the murder of Beaton; which indeed happened shortly after, he being assassinated in his chamber, May 29th, 1547. He was a haughty

bigotted churchman, and thought severity the proper method of suppressing heresy: he had great talents, and vices that were no less conspicuous *.

BEATS, in a watch or clock, are the strokes made by the fangs or pallets of the spindle of the balance, or of the pads in a royal pendulum †.

BEUCAIRE, a town of Languedoc in France, situated on the banks of the river Rhone, in E. Long. 5. 49. N. Lat. 43. 39.

BEAUCE, a province of France, lying between the isle of France, Blois, and Orléans. It is so very fertile in wheat, that it is called the *Granary* of Paris. Chartres is the principal town.

BEAVER, in zoology. See **CASTOR**.

BEAVER-SKINS, in commerce. Of these, merchants distinguish three sorts; the new, the dry, and the fat.

The new beaver, which is also called the *white beaver*, or *Muscovy beaver*, because it is commonly kept to be sent into Muscovy, is that which the savages catch in their winter hunting. It is the best, and the most proper for making fine furs, because it has lost none of its hair by shedding.

The dry beaver, which is sometimes called *lean beaver*, comes from the summer hunting, which is the time when these animals lose part of their hair. This sort of beaver is much inferior to the former, yet it may also be employed in furs; but it is chiefly used in the manufacture of hats. The French call it *summer castor* or *beaver*.

The fat beaver is that which has contracted a certain gross and oily humour, from the sweat which exhalates from the bodies of the savages, who wear it for some time. Though this sort be better than the dry beaver, yet it is used only in the making of hats.

Besides hats and furs, in which the beaver's hair is commonly used, they attempted in France, in the year 1699, to make other manufactures of it: and, accordingly, they made cloths, flannels, stockings, &c. partly of beaver's hair, and partly of Segovia wool. This manufactory, which was set up at Paris, in St Anthony's suburbs, succeeded at first pretty well; and, according to the genius of the French, the novelty of the thing brought into some repute the stuffs, stockings, gloves, and cloth, made of beaver's hair. But they went out of fashion on a sudden, because it was found, by experience, that they were of a very bad wear, and, besides, that the colours faded very much: when they had been wet, they became dry and hard, like felt, which occasioned the miscarriage of the manufactory for that time.

When the hair has been cut off from the beavers skins, to be used in the manufacturing of hats, those skins are still employed by several workmen; namely, by the trunk-makers, to cover trunks and boxes; by the shoemakers, to put into slippers; and by turners, to make sieves for sifting grain and seeds *.

BEAUFORT, a town of Anjou in France, with a castle, near the river Authion. It contains two parishes and a convent of Recolets, and yet has not 100 houses. W. Long. 0. 3. N. Lat. 47. 26.

BEAUFORT, a strong town of Savoy in Italy, on the river Oron. E. Long. 6. 48. N. Lat. 45. 40.

BEAUGENCY, a town of the Orléannois in France, seated on the river Loire, in E. Long. 1. 46. N. Lat. 47. 48.

Beats
Beaugency.

* See
(History of)
Scotland.
† See Watch-
Making.

* See the
articles Ca-
nda, and
Hudson's
Bay.

Beaujeu
Beaumont.

BEAUJEU, a town of France in Beaujolais, with an old castle. It is seated on the river Ardiere, at the foot of a mountain, in E. Long. 4. 40. N. Lat. 46. 9.

BEAUJOLOIS, a district of France, bounded on the south by Lionnois proper, on the west by Forez, on the north by Burgundy, and on the west by the principality of Dombes. It is 25 miles in length, and 20 in breadth: Ville Franche is the capital town.

BEAULIEU, (Sebastian de Pontault de), a celebrated French engineer, and field marshal under Louis XIV. He published plans of all the military expeditions of his master, with military lectures annexed. Died in 1674.

BEAUMARIS, a market-town of Anglesey in North Wales. W. Long. 4. 15. N. Lat. 53. 25.

BEAUMONT (Sir John), the elder brother of Mr Francis Beaumont the famous dramatic poet; was born in the year 1582, and in 1626 had the dignity of a baronet conferred upon him by king Charles I. In his youth he applied himself to the Muses with good success; and wrote, *The Crown of Thorns*, a poem, in eight books: a miscellany, intitled *Bosworth Field*: Translations from the Latin Poets: and several poems on religious and political subjects; as, *On the Festivals*; *On the Blessed Trinity*; *A Dialogue between the World, a Pilgrim, and Virtue*; *Of the miserable State of Man*; *Of Sickness*, &c. He died in 1628. His poetic genius was celebrated by Ben Jonson, Michael Drayton, and others.

BEAUMONT and FLETCHER, two celebrated English dramatic writers, who flourished in the reign of James I. and so closely connected both as authors and as friends, that it has been judged not improper to give them under one article.

Mr Francis Beaumont was descended from an ancient family of his name at Grace-dieu in Leicestershire, where he was born about the year 1585 or 1586, in the reign of queen Elizabeth. His grandfather, John Beaumont, was master of the rolls, and his father Francis Beaumont one of the judges of the common-pleas. He was educated at Cambridge, and afterwards admitted of the Inner Temple. It is not, however, apparent that he made any great proficiency in the law, that being a study probably too dry and unentertaining to be attended to by a man of his fertile and sprightly genius. And indeed, we should scarcely be surpris'd to find that he had given no application to any study but poetry, nor attended on any court but that of the Muses: but on the contrary our admiration might fix itself in the opposite extreme, and fill us with astonishment at the extreme assiduity of his genius and rapidity of his pen, when we look back on the voluminousness of his works, and then inquire into the time allowed him for them; works that might well have taken up a long life to have executed. For although, out of 53 plays which are collected together as the labours of these united authors, Mr Beaumont was concerned in much the greatest part of them, yet he did not live to complete his 30th year, the king of terrors summoning him away in the beginning of March 1615, on the 9th day of which he was interred in the entrance of St Benedict's chapel in Westminster-Abbey. There is no inscription on his tomb. But there are two epitaphs to his memory; one by his elder brother Sir John Beaumont:

On death, thy murderer, this revenge I take;
I slight thy terrors, and just question make,
Which of us two the best precedence have,
Mine to this wretched world, thine to the grave.
Thou should'st have followed me; but death, to blame,
Miscounted years, and measur'd age by fame.
So dearly hast thou bought thy precious lines;
Their praise grew swiftly, so thy life declines.
Thy muse, the hearer's queen, the reader's love,
All cars, all hearts (but death's), could please and move.
Bosworth Field, p. 104.

The other is by bishop Corbet. (*Poems*, p. 68.)

He that hath such acuteness and such wit,
As would ask ten good heads to husband it;
He that can write so well, that no man dare
Refuse it for the best; let him beware:
Beaumont is dead, by whose sole death appears,
Wit's a disease consumes men in few years.

He left a daughter, Frances Beaumont, who died in Leicestershire since the year 1700. She had in her possession several poems of her father's writing; but they were lost at sea in her voyage from Ireland, where she had lived for some time in the duke of Ormond's family.

Mr John Fletcher was not more meanly defended than his poetical colleague; his father, the reverend Dr Fletcher, having been first made bishop of Bristol by queen Elizabeth, and afterwards by the same monarch, in the year 1593, translated to the rich and honourable see of London. Our poet was born in 1576; and was, as well as his friend, educated at Cambridge, where he made a great proficiency in his studies, and was accounted a very good scholar. His natural vivacity of wit, for which he was remarkable, soon rendered him a devotee to the muses; and his close attention to their service, and fortunate connection with a genius equal to his own, soon raised him to one of the highest places in the temple of poetical fame. As he was born near ten years before Mr Beaumont, so did he also survive him by an equal number of years; the general calamity of a plague, which happened in the year 1625, involving him in its great destruction, he being at that time 49 years of age.

During the joint lives of these two great poets, it appears that they wrote nothing separately, excepting one little piece by each, which seem'd of too trivial a nature for either to require assistance in, viz. *The Faithful Shepherd*, a pastoral, by Fletcher; and *The Masque of Gray's-Inn Gentlemen*, by Beaumont. Yet what share each had in the writing or designing of the pieces thus compos'd by them jointly, there is no possibility of determining. It is however generally allowed, that Fletcher's peculiar talent was *wit*, and Beaumont's, though much the younger man, *judgment*. Nay, so extraordinary was the latter property in Mr Beaumont, that it is recorded of the great Ben Jonson, who seems moreover to have had a sufficient degree of self-opinion of his own abilities, that he constantly, so long as this gentleman lived, submitted his own writings to his censure, and, as it is thought, availed himself of his judgment at least in the correcting, if not even in the contriving, all his plots. It is probable, therefore, that the forming the plots and contriving the conduct of the fable, the writing of the more serious and pathetic parts, and lopping the redundant branches of Fletcher's wit, whose luxuriance, we are told, frequently stood in need of calligation, might be in general Beaumont's portion in the work; while Fletcher, whose conversation with the

the *beau monde* (which indeed both of them from their births and stations in life had been ever accustomed to), added to the volatile and lively turn he possessed, rendered him perfectly master of dialogue and polite language, might execute the designs formed by the other, and raise the superstructure of those lively and spirited scenes which Beaumont had only laid the foundation of; and in this he was so successful, that though his wit and raillery were extremely keen and poignant, yet they were at the same time so perfectly genteel, that they used rather to please than disgust the very persons on whom they seemed to reflect. Yet that Fletcher was not entirely excluded from a share in the conduct of the drama, may be gathered from a story related by Winstanley, viz. that our two bards having concerted the rough draught of a tragedy over a bottle of wine at a tavern, Fletcher said, he would undertake to *kill the king*, which words being overheard by the waiter, who had not happened to have been witnesses to the context of their conversation, he lodged an information of treason against them. But on their explanation of it only to mean the destruction of a theatrical monarch, their loyalty moreover being unquestioned, the affair ended in a jest.

On the whole, the works of these authors have undoubtedly very great merit, and some of their pieces deservedly stand on the list of the present ornaments of the theatre. The plots are ingenious, interesting, and well managed; the characters strongly marked; and the dialogue sprightly and natural: yet there is in the latter a coarseness which is not suitable to the politeness of the present age; and a fondness of repartee, which frequently runs into obscenity, and which we may suppose was the vice of that time, since even the delicate Shakespeare himself is not entirely free from it. But as these authors have more of that kind of wit than the last-mentioned writer, it is not to be wondered if their works were, in the licentious reign of Charles II. preferred to his. Now, however, to the honour of the present taste be it spoken, the tables are entirely turned; and while Shakespeare's immortal works are our constant and daily fare, those of Beaumont and Fletcher, tho' delicate in their kind, are only occasionally served up; and even then great pains are taken to clear them of that *sumet*, which the *haut gout* of their contemporaries considered as their supremest relish, but which the more unimproved taste of ours has been justly taught to look on as what it really is, no more than a corrupt and unwholesome taint.

Some of their plays were printed in quarto during the lives of the authors; and in the year 1645, there was published in folio a collection of such plays as had not been printed before, amounting to between 30 and 40. This collection was published by Mr Shirley, after the shutting up of the theatres; and dedicated to the earl of Pembroke, by ten of the most famous actors. In 1679, there was an edition of all their plays published in folio; another edition in 1711 by Mr Tonson; in seven volumes 8^{vo}, and the last in 1751.

BEAUMONT, a town of the Netherlands, in Hainault, on the confines of the territory of Liege. It was ceded to the French in 1684; and taken in 1691 by the English, who blew up the castle. It is situated between the rivers Maese and Sambre, in E. Long. 4. 1. N. Lat. 50. 12.

VOL. II.

BEAUMONT *le Roger*, a town of Upper Normandy Beaumont in France. E. Long. 0. 56. N. Lat. 49. 2.

BEAUMONT *le Vicomte*, a town of Maine in France. E. Long. 0. 10. N. Lat. 48. 12.

BEAUMONT *sur Oise*, a town in the Isle of France, seated on the declivity of a hill, with a bridge over the river Oise. E. Long. 2. 29. N. Lat. 49. 9.

BEAUNE, a handsome town of France, in Burgundy, remarkable for its excellent wine, and for an hospital founded here in 1443. Its collegiate church is also one of the finest in France: the great altar is adorned with a table enriched with jewels; and its organs are placed on a piece of architecture which is the admiration of the curious. E. Long. 4. 50. N. Lat. 47. 2.

BEAUSOBRE (Isaac de), a learned minister of the reformed religion, was born at Niort. He retired into Holland; and from thence to Berlin, where he was made chaplain to the king of Prussia, and counsellor of the Royal Consistory. He wrote a Defence of the Doctrines of the Reformation; a Translation of the New Testament into French, with notes, in two vols quarto; and several other works. He died in 1738, aged 79.

BEAUTY, in its native signification, is appropriated to objects of sight. Objects of the other senses may be agreeable, such as the sounds of musical instruments, the smoothness and softness of some surfaces; but the agreeableness called *beauty* belongs to objects of sight.

Objects of sight are more complex than those of any other sense: in the simplest, we perceive colour, figure, length, breadth, thickness. A tree is composed of a trunk, branches, and leaves; it has colour, figure, size, and sometimes motion: by means of each of these particulars, separately considered, it appears beautiful; but a complex perception of the whole greatly augments the beauty of the object. The human body is a composition of numberless beauties arising from the parts and qualities of the object, various colours, various motions, figures, size, &c. all united in one complex object, and striking the eye with combined force. Hence it is, that beauty, a quality so remarkable in visible objects, lends its name to every thing that is eminently agreeable. Thus, by a figure of speech, we say, a *beautiful sound*, a *beautiful thought*, a *beautiful discovery*, &c.

Considering attentively the beauty of visible objects, two kinds are discovered. The first may be termed *intrinsic beauty*, because it is discovered in a single object, without relation to any other: the other may be termed *relative*, being founded on the relation of objects. Intrinsic beauty is a perception of sense merely; for to perceive the beauty of a spreading oak, or of a flowing river, no more is required but singly an act of vision. Relative beauty is accompanied with an act of understanding and reflection: for we perceive not the relative beauty of a fine instrument or engine, until we learn its use and destination. In a word, intrinsic beauty is ultimate; and relative beauty is that of means relating to some good end or purpose. These different beauties agree in one capital circumstance, that both are equally perceived as belonging to the object; which will be readily admitted with respect to intrinsic beauty, but is not so obvious with respect to the other. The

Beauty.

utility of the plough, for example, may make it an object of admiration or of desire; but why should utility make it beautiful? A natural propensity of the human mind will explain this difficulty: By an easy transition of ideas, the beauty of the effect is transferred to the cause, and is perceived as one of the qualities of the cause. Thus a subject void of intrinsic beauty, appears beautiful by its utility; a dwelling house void of all regularity, is however beautiful in the view of convenience; and the want of symmetry in a tree, will not prevent its appearing beautiful, if it be known to produce good fruit.

When these two beauties concur in any object, it appears delightful. Every member of the human body possesses both in a high degree.

The beauty of utility, being accurately proportioned to the degree of utility, requires no illustration: But intrinsic beauty, being more complex, cannot be handled distinctly without being analysed. If a tree be beautiful by means of its colour, figure, motion, size, &c. it is in reality possessed of so many different beauties. The beauty of colour is too familiar to need explanation. The beauty of figure is more: for example, viewing any body as a whole, the beauty of its figure arises from regularity and simplicity; viewing the parts with relation to each other, uniformity, proportion, and order, contribute to its beauty. The beauties of grandeur and motion are considered separately*.

* See Grandeur and Motion.

We shall here make a few observations on simplicity, which may be of use in examining the beauty of single objects. A multitude of objects crowding into the mind at once, disturb the attention, and pass without making any lasting impression: In the same manner, even a single object, consisting of a multiplicity of parts, equals not, in strength of impression, a more simple object comprehended in one view. This justifies simplicity in works of art, as opposed to complicated circumstances and crowded ornaments.

It would be endless to enumerate the effects that are produced by the various combinations of the principles of beauty. A few examples will be sufficient to give the reader some idea of this subject. A circle and a square are each perfectly regular: a square, however, is less beautiful than a circle; and the reason is, that the attention is divided among the sides and angles of a square; whereas the circumference of a circle, being a single object, makes one entire impression: And thus simplicity contributes to beauty. For the same reason, a square is more beautiful than a hexagon or octagon. A square is likewise more beautiful than a parallelogram, because it is more regular and uniform. But this holds with respect to intrinsic beauty only: for in many instances, as in the doors and windows of a dwelling-house, utility turns the scales on the side of the parallelogram.

Again, a parallelogram depends, for its beauty, on the proportion of its sides: A great inequality of its sides annihilates its beauty: Approximation toward equality hath the same effect; for proportion there degenerates into imperfect uniformity, and the figure appears an unsuccessful attempt toward a square. And hence proportion contributes to beauty.

An equilateral triangle yields not to a square in regularity nor in uniformity of parts, and it is more simple. But an equilateral triangle is less beautiful than

a square; which must be owing to inferiority of order in the position of its parts; the order arising from the equal inclination of the sides of such an angle, is more obscure than the parallelism of the sides of a square. And hence order contributes to beauty not less than simplicity, regularity, or proportion.

Uniformity is singular in one circumstance, that it is apt to disgust by excess. A number of things destined for the same use, as windows, chairs, &c. cannot be too uniform. But a scrupulous uniformity of parts in a large garden or field, is far from being agreeable.

In all the works of nature, simplicity makes a capital figure. It also makes a figure in works of art: Profuse ornament in painting, gardening, or architecture, as well as in dress or in language, shows a mean or corrupted taste. Simplicity in behaviour and manners has an enchanting effect, and never fails to gain our affection. Very different are the artificial manners of modern times. A gradual progress from simplicity to complex forms and profuse ornament, seems to be the fate of all the fine arts; resembling behaviour, which from original candor and simplicity, has degenerated into duplicity of heart and artificial refinements. At present, literary productions are crowded with words, epithets, figures: In music, sentiment is neglected for the luxury of harmony, and for difficult movement.

With regard to the final cause of beauty, one thing is evident, that our relish of regularity, uniformity, proportion, order, and simplicity, contributes greatly to enhance the beauty of the objects that surround us, and of course tends to our happiness. We may be confirmed in his thought, upon reflecting, that our taste for these particulars is not accidental, but uniform and universal, making a branch of our nature. At the same time, regularity, uniformity, order, and simplicity, contribute each of them to readiness of apprehension, and enable us to form more distinct ideas of objects than can be done where these particulars are wanting. In some instances, as in animals, proportion is evidently connected with utility, and is the more agreeable on that account.

Beauty, in many instances, promotes industry; and as it is frequently connected with utility, it proves an additional incitement to enrich our fields and improve our manufactures. These, however, are but slight effects, compared with the connections that are formed among individuals in society by means of beauty. The qualifications of the head and heart are undoubtedly the most solid and most permanent foundations of such connections: But, as external beauty lies more in view, and is more obvious to the bulk of mankind, than the qualities now mentioned, the sense of beauty has a more extensive influence in forming these connections. At any rate, it concurs in an eminent degree with mental qualifications, in producing social intercourse, mutual good-will, and consequently mutual aid and support, which are the life of society: it must not however be overlooked, that the sense of beauty does not tend to advance the interests of society, but when in a due mean with respect to strength. Love, in particular, arising from a sense of beauty, loses, when excessive, its social character; the appetite for gratification, prevailing over affection for the beloved object, is ungovernable, and tends violently to its end, regardless of the misery that must follow. Love, in
this

ty this state, is no longer a sweet agreeable passion : it becomes painful, like hunger or thirst; and produceth no happiness, but in the instant of fruition. This suggests an important lesson, that moderation in our desires and appetites, which fits us for doing our duty, contributes at the same time the most to happiness; even social passions, when moderate, are more pleasant than when they swell beyond proper bounds.

BEAUTY, in architecture, painting, and other arts, is the harmony and justness of the whole composition taken together.

BEAUVAIS, an episcopal city in the Isle of France, and capital of the Beauvoisis. The cathedral church is dedicated to St Peter, and is much admired for its fine architecture. It contains a great number of relics, and a library of curious books. There are several other churches, among which is one dedicated to St Stephen, remarkable for its curious windows. The town was ineffectually besieged by the English in 1443, and by the duke of Burgundy with an army of 80,000 men. In this last siege the women signalized themselves under the conduct of Jeane Hachette, who set up a standard yet preserved in the church of the Jacobins. The duke was obliged to raise the siege; and in memory of the women's exploits, they walk first in a procession on the 10th of July, the anniversary of their deliverance. The inhabitants carry on a good trade in beautiful tapestry. Beauvais is situated on the river Therin, in E. Long. 2. 15. N. Lat. 49. 26.

BEAUVAIS, a town of France, in Upper Languedoc, seated on the river Tescou. E. Long. 1. 43. N. Lat. 44. 2.

BEAUVIN, a city of Burgundy in France, in E. Long. 4. 50. N. Lat. 47.

BEAUVOIR *sur Mer*, a maritime town of Poitou, in France, with the title of marquissate. W. Long. 1. 5. N. Lat. 46. 45.

BEAUVOISIS, a territory of France, formerly part of Picardy, but now of the Isle of France. Beauvais is the capital.

BEBELINGUEN, a town of Germany, in the duchy of Württemberg, seated on a lake from which proceeds the river Worm. E. Long. 9. 8. N. Lat. 48. 45.

BEBRYCIA, (anc. geog.), an ancient name of Bithynia, so called from the Bebryces its inhabitants. The Bebryces were afterwards driven out by the Thracians, *viz.* the Bithyni and Thyni; from whom, in process of time, the country took the name of *Bithynia*. See BITHYNIA.

BEC, a town of France, in Normandy, seated on a tongue of land, at the confluence of two rivers, in E. Long. 0. 52. N. Lat. 48. 45.

BECAH, or BEKAH, a Jewish coin, being half a shekel. In Dr Arbuthnot's table of reductions, the bekah amounts to $13\frac{1}{2}$ d. in Dr Prideaux's computation to 1s. 6d. Every Israelite paid an hundred bekahs a head annually for the support of the temple.

BECALM, in a general sense, signifies to appease, to allay.

BECALM, in the sea language. A ship is said to be becalmed, when there is not a breath of wind to fill the sails.

BECANOR, a town of India, in Asia, seated on the river Ganges, in E. Long. 83. 5. N. Lat. 27. 40.

BECCABUNGA, BROOKLINE; the trivial name of *Beccabunga* a species of veronica. See VERONICA.

BECCLES, a large town of Suffolk in England, in E. Long. 1. 30. N. Lat. 52. 38.

BECHER (John Joachim), a celebrated chemist, was born at Spire, in 1645. He was connected with the most learned men in Europe; and the emperor, the electors of Mentz and Bavaria, and other persons of high rank, furnished him with the means of making experiments in mathematics, natural philosophy, medicine, and chemistry. As his thoughts were very judicious and uncommon with respect to economy and to increasing the revenues of a state, he was invited to Vienna, where he contributed greatly to the establishment of several manufactures, a chamber of commerce, and an India company; but the jealousy of some of the ministers occasioned his disgrace and ruin. He was not less unhappy at Mentz, Munich, and Wurtzburg; which determined him to go to Haerlem, where he invented a machine for working a great quantity of silk in a little time, and with few hands: but new misfortunes made him come to England, and he died at London in 1685. He wrote many works; the principal of which are, 1. *Physica Subterranea*, which was reprinted at Leipzig in 1703, and in 1739, in octavo, with a small treatise, by E. Stahl, intitled *Specimen Becherianum*. 2. *Experimentum chymicum novum*, 8vo. 3. *Character pro Notitia Linguarum universalis*. 4. *Institutiones Chymice, seu Manuductio ad Philosophiam Hermeticam*, 4to. 5. *Institutiones Chymice prodromus*, 12mo. 6. *Experimentum novum ac curiosum de Minera arenaria perpetua*, &c.

BECHIN, a town of Bohemia, in a circle of the same name. It was taken and burnt by general Bequoy in 1619. It is seated on the river Lausnitz, in E. Long. 15. 12. N. Lat. 49. 14.

BECK, or BEKE, a word which imports a small stream of water issuing from some burn or spring. Hence *Hell-becks*, little brooks in the rough and wild mountains about Richmond near Lancashire, so called on account of their ghastliness and depth.

Beck is chiefly used among us in the composition of names of places originally situated on rivulets: hence Walbeck, Bournbeck, &c. The Germans use *beck* in the same manner.

BECKET (Thomas), lord chancellor of England, archbishop of Canterbury in the 12th century. The story of his birth is as extraordinary as that of his life. It is related, that his father Gilbert Becket, some time sheriff of London, went on a pilgrimage to Jerusalem, where, being surprised and enslaved by a party of Saracens, his master's daughter fell in love with him; and that when he made his escape, she followed him to London. So singular an instance of heroic affection struck him; and after consulting with some bishops, he baptized her by the name of *Matilda*, and married her; from which marriage proceeded the haughty Thomas Becket. Being raised to the archbishoprick, he began the great dispute between the crown and the mitre, and sided with the pope: at which king Henry was greatly offended; and calling an assembly of the bishops at Westminster, offered six articles against papal encroachments, which he urged Becket to assent to. Becket, at the importunities of several lords, signed them; but relapsing, he was ordered to be tried as a traitor;

Becket,
Beckingham.

traitor; upon which he fled into Flanders. The king banished all his relations, and Becket excommunicated all his opposers. At last, after seven years, by the intercession of the French king and the pope, he returned; but refused to absolve these bishops and others he had excommunicated: whereupon the king grew enraged; and four of his knights, thinking to please the king, murdered Becket. Two years after, Becket was canonized; and the same year, a particular collect was appointed to be read in all the churches of the province of Canterbury, for expiating the guilt of his murder. The next year, king Henry returning from France, went to Canterbury, where he did penance, as a testimony of his grief for the murder. In 1221, Becket's body was taken up, 50 years after his murder, in the presence of king Henry III. and a great concourse of the nobility and others, and deposited in a rich shrine, erected at the expence of Stephen Langton archbishop of Canterbury, which was soon visited from all parts, and enriched with the most costly gifts and offerings; and the miracles said to be wrought at his tomb were so numerous, that Gervase of Canterbury tells us, there were two large volumes of them kept in that church. The monks used to raise his body every year; and the day on which this ceremony was performed, which was called the *day of his translation*, was a general holiday: every 50th year there was celebrated a jubilee to his honour, which lasted 15 days: plenary indulgences were then granted to all that visited his tomb; and 100,000 pilgrims have been registered at a time in Canterbury. The devotion towards him had quite effaced in that town the adoration of the Deity; nay, even that of the Virgin. At God's altar, for instance, there were offered in one year 3*l.* 2*s.* 6*d.* at the Virgin's, 63*l.* 5*s.* 6*d.* at St Thomas's, 832*l.* 12*s.* 3*d.* But next year, the disproportion was still greater: there was not a penny offered at God's altar; the Virgin's gained only 4*l.* 1*s.* 8*d.* but St Thomas had got for his share 954*l.* 6*s.* 3*d.* Lewis VII. of France had made a pilgrimage to this miraculous tomb, and had bestowed on the shrine a jewel which was esteemed the richest in Christendom. Henry VIII. to whom, it may easily be imagined, how obnoxious a saint of this character behaved to appear, and how much contrary to all his projects for degrading the authority of the court of Rome, not only pillaged the rich shrine dedicated to St Thomas; but made the saint himself be cited to appear in court, and be tried and condemned as a traitor: he ordered his name to be struck out of the calendar; the office for his festival to be expunged from all breviaries; and his bones to be burnt, and the ashes thrown in the air.

BECKINGHAM (Charles), an English dramatic writer, was the son of a linen-draper in London, and born in 1699. He was educated at that great nursery of learning Merchant-Taylor's school, under the learned Dr Smith, where he made a very great proficiency in all his studies, and gave the strongest testimonials of very extraordinary abilities. In poetry more particularly he very early discovered an uncommon genius, two dramatic pieces of his writing being represented on the stage before he had completed his 20th year: and those not such as required the least indulgence or allowance on account of his years; but such as bore evidence to a boldness of sentiment, an accuracy of dic-

tion, an ingenuity of conduct, and a maturity of judgment, which would have done honour to a much more ripened age. The titles of his plays, both of which are tragedies, are, 1. *Henry IV. of France.* 2. *Scipio Africanus.* At the representation of the last-mentioned piece, which indeed was the first he wrote, his school-master Dr Smith, as a peculiar mark of distinction and regard to the merit of his pupil, gave all his boys a holiday on the afternoon of the author's benefit, in order to afford an opportunity, to such of them as pleased, to pay their compliments to their school-fellow on that occasion. Besides these dramatic pieces, he wrote several other poems: but his genius was not permitted any very long period to expand itself in; for he died on the 18th of February, 1730, in the 32^d year of his age.

BECKUM, a town of the bishopric of Munster, in Germany, seated at the source of the river Verfe, in E. Long. 8. 18. N. Lat. 51. 46.

BECSANGIL, anciently Bithynia, a province of Natolia in Asia; bounded on the north, by the Black Sea; on the west, by the sea of Marmora; on the south, by Natolia Proper; and on the east, by the province of Bolli. The principal town is Bursa.

BECTASSE, an order or sect of religious among the Turks, denominated from their founder *Bectas*, preacher to sultan Amurath. All the Janizaries belonging to the Porte are of the religion of bectasse, being even said to have derived their origin from the founder of this sect. The habit of the bectasse is white: on their heads they wear white caps of several pieces, with turbans of wool, twisted rope-fashion. They observe constantly the hour of prayer, which they perform in their own assemblies, and make frequent declarations of the unity of God.

BED, a convenience for stretching and composing the body on, for ease, rest, or sleep, consisting generally of feathers inclosed in a ticken case. There are varieties of beds, as a standing bed, a fetter-bed, a tent-bed, a truckle-bed, &c.

It was universally the practice, in the first ages, for mankind to sleep upon skins of beasts. It was originally the custom of the Greeks and Romans. It was particularly the custom of the ancient Britons, before the Roman invasion; and these skins were spread on the floor of their apartments. Afterwards they were changed for loose rushes and heather, as the Welch a few years ago lay on the former, and the Highlanders of Scotland sleep on the latter to this present moment. In process of time, the Romans suggested to the interior Britons the use, and the introduction of agriculture supplied them with the means, of the nearer convenience of straw-beds. The beds of the * Roman gentry at this period were generally filled with feathers, and those of the inns with the soft down of reeds. But for many ages the beds of the Italians had been constantly composed of straw; it still formed those of the soldiers and officers at the conquest of Lancashire; and from both, our countrymen learnt their use. But it appears to have been taken up only by the gentlemen, as the common Welsh had their beds thinly stuffed with rushes as late as the conclusion of the 12th century; and with the gentlemen it continued many ages afterwards. Straw was used even in the royal chambers of England, as late as the close of the 13th. Most of the peasants

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* Plin
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sants about Manchester lie on chaff at present: and straw-beds remain to this day general in France and Italy.—But they were no longer suffered to rest upon the ground. The better mode that had anciently prevailed in the east, and long before been introduced into Italy, was adopted in Britain; and they were now mounted on pedestals †. This, however, was equally confined to the gentlemen. The bed still continued on the floor among the common people. And the gross custom, that had prevailed from the beginning, was retained by the lower Britons to the last; and these ground-beds were laid along the walls of their houses, and formed one common dormitory for all the members of the family. The fashion continued universally among the inferior ranks of the Welch within these four or five ages, and with the more uncivilized part of the Highlanders nearly to our own times. And even at no great distance from Manchester, in the neighbouring Buxton, and within these 60 or 70 years, the persons that repaired to the bath are all said to have slept in one long chamber together; the upper part being allotted to the ladies, and the lower to the gentlemen, and only partitioned from each other by a curtain.

Dining-BED, lectus tricliniarius, or discubitorius, that whereon the ancients lay at meals. The dining or discubitory beds were four or five feet high. Three of these beds were ordinarily ranged by a square table (whence both the table and the room where they eat were called *triclinium*) in such a manner, that one of the sides of the table remained open, and accessible to the waiters. Each bed would hold three or four, rarely five persons. These beds were unknown before the second Punic war: the Romans, till then, sat down to eat on plain wooden benches, in imitation of the heroes of Homer, or, as Varro expresses it, after the manner of the Lacedæmonians and Cretans. Scipio Africanus first made an innovation: he had brought from Carthage some of these little beds called *punicani*, or *archæici*; being of a wood common enough, very low, stuffed only with straw or hay, and covered with goats or sheep skins, *hædinis pellibus strati*. In reality, there was no great difference, as to delicacy, between these new beds and the ancient benches; but the custom of frequent bathing, which began then to obtain, by softening and relaxing the body, put men on trying to rest themselves more commodiously by lying along than by sitting down. For the ladies, it did not seem at first consistent with their modesty to adopt the mode of lying; accordingly they kept to the old custom all the time of the commonwealth; but, from the first Cæsars, they eat on their beds. For the youth, who had not yet put on the *toga virilis*, they were long kept to the ancient discipline. When they were admitted to table, they only sat on the edge of the beds of their nearest relations. Never, says Suetonius, did the young Cæsars, Caius and Lucius, eat at the table of Augustus; but they were set in *imo loco*, or, as Tacitus expresses it, *ad lecti fulera*. From the greatest simplicity, the Romans, by degrees, carried their dining-beds to the most surprising magnificence. Pliny assures us, it was no new thing to see them covered over with plates of silver, adorned with the softest mats, and the richest counterpanes. Lampridius, speaking of Heliogabalus, says, he had beds of solid silver, *solido argento habuit lectos & tricliniarios, & cubiculares*. We may add,

that Pompey, in his third triumph, brought in beds of gold.—The Romans had also beds whereon they studied, and beds whereon the dead were carried to the funeral pile.

BED-Moulding in architecture, a term used for those members of a cornice which are placed below the coronet; and now usually consists of an ogee, a list, a large boustine, and another list under the coronet.

BED of Justice, in the French customs, a throne upon which the king is seated when he goes to the parliament. The king never holds a bed of justice unless for affairs that concern the state, and then all the officers of parliament are clothed in scarlet robes.

BED of the Carriage of a Great Gun, a thick plank, that lies under the piece; being, as it were, the body of the carriage.

BED, in masonry, a course or range of stones; and the joint of the bed is the mortar between two stones, placed over each other.

BED, in gardening, square or oblong pieces of ground, in a garden, raised a little above the level of the adjoining ground, and wherein they sow seeds or plant roots.

Hot-BED. See *HOT-BED*.

Lords of the BED-Chamber, in the British customs, ten lords who attend in their turns, each a week; during which time they lie in the king's bed-chamber, and wait on him when he dines in private.

BEDA, commonly called *venerable Bede*, one of our most ancient historians, was born in the year 672, in the neighbourhood of Weremouth, in the bishoprick of Durham. He was educated by the abbot Benedict in the monastery of St Peter, near the mouth of the river Wyre. At the age of 19 he was ordained deacon, and priest in the year 702. About this time he was invited to Rome by Pope Sergius; but there is no sufficient reason to believe that he accepted the invitation. In the year 731 he published his Ecclesiastical History; a work of so much merit, notwithstanding the legendary tales it contains, that it were alone sufficient to immortalize the author. He died in the year 735 of a lingering consumption, probably occasioned by a sedentary life, and a long uninterrupted application to study and literary compositions, of which he left an incredible number. He was buried in the church of his convent at Jarrow; but his bones were afterwards removed to Durham, and there deposited in the same coffin with those of St Cuthbert. Bede was undoubtedly a singular phenomenon in an ignorant and illiterate age. His learning, for the times, was extensive, his application incredible, his piety exemplary, and his modesty excessive. He was universally admired, consulted, and esteemed, during his life; and his writings are deservedly considered as the foundation of our ecclesiastical history. His language is neither elegant nor pure, but perspicuous and easy.—All his works are in Latin. The first general collection of them appeared at Paris, in 1544, in three volumes in folio. They were printed again at the same place in 1554, in eight volumes. They were also published in the same size and number of volumes at Basil in 1563, reprinted at Cologne in 1612, and at the same place in 1688. Besides this general collection, there are several of his compositions, which have been printed separately, or amongst

Bedall
Bedell.

amongst the collections of the writings of ancient authors; and there are several manuscripts ascribed to him, which are preserved in the different libraries in Oxford and Cambridge.

BEDALL, a town in the north riding of Yorkshire. Through this town passes a Roman caufeway to Richmond, Barnard-castle, &c. The parts adjacent are noted for hunting and road horses. W. Long.

31. o. N. Lat. 54. 30.

BEDARIEUX, or BÉC D'ARIEUX, a town of Languedoc in France, seated on the river Obe, in E. Long.

3. 24. N. Lat. 43. 29.

BEDEL. See BEADLE.

BEDEL, a small town in the north riding of Yorkshire, seated on a little brook; in W. Long. 1. 30. N. Lat. 54. 30.

BEDELL (Dr William), a learned prelate, born in Essex in 1570. He went with Sir Henry Wotton the English ambassador, to the republic of Venice, as his chaplain, in 1604; and continuing eight years in that city, contracted an intimate acquaintance with the famous father Paul, of whom he learned Italian so well as to translate the English Common-Prayer Book into that language: in return he drew up an English grammar for father Paul, who declared he had learned more from him in all parts of divinity, than from any one beside. He was accordingly much concerned when Bedell left Venice; and at his departure presented him with his picture, the MSS. of his History of the country of Trent, his History of the Interdict and Inquisition, with other literary donations. In 1629, he obtained the bishopric of Kilmore and Adragh in Ireland; and finding these dioceses in great disorder, applied himself vigorously to reform the abuses there. He was no persecutor of Papists, but laboured with great success to convert the better sort of the Popish clergy: he procured an Irish translation of the Common-Prayer Book, which he caused to be read in his cathedral every Sunday; and the New Testament having been translated by archbishop Daniel, he procured one of the Old Testament; which he having been prevented from printing himself, was afterward executed at the expence of the great Mr Robert Boyle. He published in 1624, a controversial book against the Roman-catholics, which he dedicated to Charles prince of Wales; and assisted the archbishop of Spalatro in finishing his famous work *De Republica Ecclesiastica*.

When the bloody rebellion broke out in Ireland, in October 1641, the bishop at first did not feel the violence of its effects; for the very rebels had conceived a great veneration for him, and they declared he should be the last Englishman they would drive out of Ireland. His was the only house in the county of Cavan that was unviolated, and it was filled with the people who fled to him for shelter. About the middle of December, however, the rebels, pursuant to orders received from their council of state at Kilkenny, required him to dismiss the people that were with him; which he refused to do, declaring he would share the same fate with the rest. Upon this they seized him, his two sons, and Mr Clogy who had married his daughter-in-law, and carried them prisoners to the castle of Cloughboughter, surrounded by a deep water, where they put them all, except the bishop, in irons; after some time, however, this part of their severity was abated. After being

confined for about three weeks, the bishop and his two sons, and Mr Clogy, were exchanged for some of the principal rebels: but the bishop died soon after, on the 7th of February 1642, his death being chiefly occasioned by his late imprisonment, and the weight of sorrows which lay upon his mind. The Irish did him unusual honours at his burial; for the chief of the rebels gathered their forces together, and with them accompanied his body to the church-yard.

BEDER, a strong town of Asia, in the dominions of the Great Mogul. E. Long. 95. 10. N. Lat. 16. 50.

BEDFORD, the county town of Bedfordshire in England, seated on both sides of the river Ouse, over which there is a stone bridge; in W. Long. o. 20. N. Lat. 52. 6. It is an ancient town, and pleasantly situated, but not very large nor well built; though the buildings are much improved of late, and the river made navigable. At this place the Britons were overthrown in a great battle in 572, by Cuthwulf the Saxon king; and here was a strong castle, built in the time of the Normans by Pagan de Beauchamp, the third baron of Bedford. It was reduced by king Stephen after a long siege; and afterwards taken by king John, after a siege of 60 days, from Fulco de Brent, who rebelled against his sovereign, notwithstanding he had taken this castle before from the barons, and had it bestowed upon him by the king. The town is a very ancient corporation, and has long sent members to parliament. It is governed at present by a mayor, recorder, two bailiffs, twelve aldermen, two chamberlains, a town-clerk, and three serjeants. The neighbouring country is very fruitful in wheat, great quantities of which are carried from hence to Hitchen and Hertford markets, fold, ground, and conveyed to London. The town has five churches, a free-school, and several hospitals, and enjoys a good trade in corn by the way of Lynn. When the river is swelled by rains, especially in winter, it is useful in Cambridgehire to say, the *bailiff of Bedford is coming*, meaning, that it is going to lay their fens under water. At this town the noted John Bunyan, author of the Pilgrim's Progress, was educated, if not born *.

BEDFORDSHIRE, an inland county of England, in the Norfolk-circuit, and diocese of Lincoln; bounded on the east and south, by Cambridgehire and Hertfordshire; on the west, by Buckinghamshire; and on the north, by Northamptonshire and Huntingdonshire. It is of an oval form, about 22 miles long, 15 broad, and 73 in compass; within which it contains 260,000 acres, 9 hundreds, 10 market towns, and 124 parishes. The air is pleasant and healthy; and the soil fruitful, especially towards the north, where it is a deep clay. Towards the middle, the face of the country is somewhat hilly and woody, and the soil sandy. Towards the south, though the soil is not very rich, yet it produces abundance of excellent barley. A great part of the country is watered by the windings of the Ouse, which divides it into two parts; and, being navigable, affords an easy conveyance for commodities to or from it. It yields also a great deal of fuller's earth, plenty of wood except on the east side, wood for dyeing, butter and cheese. Its principal manufactures are bone-lace and straw-hats. It sends four members to parliament, namely, two for Bedford, and two knights for the shire.

BEDLOE (William), who assumed the title of *capt. air*,

* See
Bunyan

captain, was an infamous adventurer of low birth, who had travelled over a great part of Europe under different names and disguises, and had passed among several ignorant persons for a man of rank and fortune. Encouraged by the success of Oates, he turned evidence, gave an account of Godfrey's murder, and added many circumstances to the narrative of the former. These villains had the boldness to accuse the queen of entering into a conspiracy against the king's life. A reward of 500 l. was voted to Bedloe by the Commons. He is said to have asserted the reality of the plot on his death-bed: but it abounds with absurdity, contradiction, and perjury; and still remains one of the greatest problems in the British annals. He died at Bristol 20th August, 1680. Giles Jacob informs us, that he was author of a play called *The Excommunicated Prince, or the False Reliâ*, 1679. The printer of it having, without the author's knowledge, added a second title, and called it *The Popish Plot in a Play*, greatly excited the curiosity of the public, who were however much disappointed when they found the plan of the piece to be founded on a quite different story. Anth. a Wood will not allow the captain the merit of this play; but asserts that it was written partly, if not entirely, by one Tho. Walter, M. A. of Jesus college, Oxford.

BEDOUINS, or BEDOUIS, a modern name of the Arabia, wild Arabs, whether in Asia or Africa *.

BEDRIACUM, (anc. geog.), a village of Italy, situated, according to Tacitus, between Verona and Cremona, but nearer the latter than the former. From the account given by that historian, Cluverius conjectures that the ancient Bedriacum stood in the place where the city of Caneto now stands †. This village was remarkable for the defeat of the emperor Galba by Otho, and afterwards of Otho by Vitellius.

BEDWIN-MAGNA, a village five miles south of Hungerford in Berkshire in England. It has neither market nor fair; but is a borough by prescription, and sends two members to parliament. It is said to have been a considerable place in the time of the Saxons, and that the traces of its fortifications are still extant.

BEE, in zoology. See APIS. But some late curious discoveries relating to bees having escaped the compiler of that article, we shall here supply the omission; and it is hoped that the importance of these discoveries, considered either in a philosophical or an economical view, will be a sufficient excuse for exhibiting them at so great length.

"Discoveries on the sex of BEES, explaining the manner in which their species is propagated; with an account of the utility that may be derived from those discoveries by the actual application of them to practice †." The most skilful naturalists have been strangely misled in their opinion, that the bees, as well as the other tribes of animals, are perpetuated by copulation; though they acknowledge that they have never been able to detect them in the act. This part of physics has been the principal object of my researches for several years past, having been insensibly engaged in it by the pleasure I took in so curious an inquiry. The results of various experiments, made all in glass-hives, which carry with them an entire evidence, afford sufficient reasons to assert, that bees belong to that class of animals among which, altho' they have sexes, a true copulation cannot be proved; and that their *ova*, like the spawn of fishes,

most probably owe their fecundation to an impregnation from the males, as will appear in the sequel of this narrative.

"In order to be the better understood in the relation of my own experiments on the fecundation of bees, I here premise the outlines of the opinions generally adopted by naturalists on that head. They assert, that the queen is the only female in the hive, and the mother of the next generation; that the drones are the males by which she is fecundated; and that the working bees, or bees that collect wax on the flowers, that knead it and form from it the combs and cells which they afterwards fill with honey, are of neither sex.

"But of late Mr Schirach, a German naturalist, has given us a very different view of the classes that constitute the republic of bees, in an ingenious publication in his own language, under the title of *The Natural History of the Queen of the Bees*; from which I beg leave to relate the author's doctrine with regard to the working-bees only, the quality and functions of the drones being points which do not appear to be yet settled by Mr Schirach himself. He asserts, that all the common bees are females in disguise; in which the organs that distinguish the sex, and particularly the ovaria, are obliterated, or at least, through their excessive minuteness, have not yet been observed: that every one of those bees in the earlier period of its existence is capable of becoming a queen-bee, if the whole community should think proper to nurse it in a particular manner, and raise it to that rank. In short, that the queen-bee lays only two kinds of eggs; viz. those that are to produce the drones, and those from which the working-bees are to proceed.

"The trials made by Mr Schirach seem to evince the truth of his conclusions in the most satisfactory manner, singular as they appear to be at first sight; and indeed, in my own judgement, from the constant happy result of my numerous experiments, which I began near two years before Mr Schirach's publication, and repeated every season since, I am enabled to pronounce on their reality. Chance befriended me in that discovery, whilst I was most anxiously endeavouring to ascertain the use of drones. It was in the spring of the year 1770, that I for the first time discovered what Maraldi had only conjectured, I mean the impregnation of the eggs by the males, and that I was made acquainted with the difference of size in the drones or males observed by Maraldi in his *Observations upon Bees* *. We have of late found great quantities of drones much smaller than those we had formerly observed, and which would not exceed in size the common bees; so that it did not have been easy to distinguish them in that 333. hive from the common bees, had not the quantity of them been very considerable. It might certainly have happened that in those hives, where we have not been able to discover large drones, there were a great number of those little ones, which may have been intermixed among common bees when we were yet ignorant that any such small drones were existing."

"Reaumur himself, says, 'We have likewise found drones that were no bigger than the common bees.'—They have notwithstanding escaped the observation of Mr Schirach, and of his friend Mr Hattorf member of an academy in Lusatia, who, in a memoir he presented in the year 1769, annihilates entirely the use of drones

* History of the Royal Academy of Sciences 1722, p.

drones in a hive; and advances this singular opinion, that the queen-bee of a hive lays eggs which produce young ones, without having any communication with the drones. For what purpose should wife nature then have furnished the drones with that large quantity of seminal liquor? To what use so large an apparatus of fecundating organs, so well described by Reaumur and Maraldi?

"But I beg leave to remark, that those gentlemen seem to have drawn too hasty conclusions from their experiments, in rejecting the drones as bearing no share in the propagation of those insects. Their observations, that hives are peopled at a time of the year when there are no drones in being, are no ways conclusive; as it is evident, that they had seen none but drones of a large size, their silence on the difference in the size of them justifying my remark. But to resume the narrative of my experiments: I had watched my glass-hives with indefatigable attention from the moment the bees, among which I had taken care to leave a number of drones, were put into them, to the time of the queen laying her eggs, which generally happens the fourth or fifth day. I observed the first or second day (always before the third) from the time the eggs are placed in the cells, that a great number of bees, fastening themselves to one another, hung down in the form of a curtain from the top to the bottom of the hive, in a similar manner they had done before at the time the queen deposited her eggs; an operation which (if we may conjecture at the instincts of insects) seems contrived to hide what is transacting: 't be that as it will, it answered the purpose of informing me that something was going forward. In fact, I presently after perceived several bees, the size of which through this thick veil (if I may so express myself) I could not rightly distinguish, inserting the posterior part of their bodies each into a cell, and sinking into it, where they continued but a little while. After they had retired, I saw plainly with the naked eye a small quantity of a whitish liquor left in the angle of the basis of each cell, containing an egg: it was less liquid than honey, and had no sweet taste at all. Within a day after, I found this liquor absorbed into the embryo; which on the fourth day is converted into a small worm, to which the working bees bring a little honey for nourishment during the first eight or ten days after its birth. After that time they cease to feed them; for they shut up the cells, where these embryos continue inclosed for ten days more, during which time they undergo various changes too tedious here to describe.

"To evince the reality of this observation, and to prove that the eggs are fecundated by the males, and that their presence is necessary at the time of breeding, I proceeded to the next experiments. They consisted in leaving in a hive the queen with only the common bees, without any drones, to see whether the eggs she laid would be prolific. I accordingly took a swarm, shook all the bees into a tub of water, and left them in it till they were quite senseless, which gave me an opportunity to distinguish the drones without any danger of being stung. After I had recovered the working-bees and their queen from the state they were in, by spreading them on brown paper in the sun, I replaced them in a glass-hive, where they soon began to work as usual: the queen laid eggs, which I little suspected

to be impregnated, as I thought I had separated all the drones or males, and therefore omitted watching the bees; but at the end of 20 days (the usual time of their hatching) I found to my surprise some of the eggs hatched into bees, others withered away, and several of them covered with honey. I immediately inferred that some of the males, having escaped my notice, had impregnated only part of the eggs; but, in order to convince myself of the truth of my supposition, I thought it necessary to take away all the brood-comb that was in the hive, in order to oblige the bees to provide a fresh quantity, being fully determined to watch narrowly their motions after new eggs should be deposited in the cells. This was done accordingly, and at last the mystery was unravelled. On the second day after the eggs were placed in the cells, I perceived the same operation which I have related in a former experiment; I mean, the bees hung down in the form of a curtain, while others thrust the posterior part of their body into the cells: I then introduced my hand into the hive, broke off a piece of the comb containing two of those insects, and kept them for examination. I found in neither of them any sting (a circumstance peculiar to drones only); and upon dissection, by the help of a Dollond's microscope, discovered in them the four cylindrical bodies, which contain the glutinous liquor of a whitish colour, observed by Maraldi in the large drones.

"Having till then never observed any difference in the size of drones, I immediately perused the Memoirs on Bees published by Messrs Maraldi and Reaumur, and found that they had remarked it frequently. The reason of that difference must, I doubt, be placed amongst other *arcana* of nature. I found myself therefore under a necessity, in my next experiments, to be more particular in destroying the males, even those which might be suspected to be such.

"I once more immersed all the same bees in water; and, when they appeared to be in a senseless state, I gently pressed every one of them between my fingers, in order to distinguish those armed with stings from those that had none, which last I might suspect to be males. Of these I found 57, exactly of the size of common bees, yielding a little whitish liquor on being pressed between the fingers. I killed every one, and replaced the swarm in a glass-hive, where they immediately applied again to the work of making cells; and on the fourth or fifth day, very early in the morning, I had the pleasure to see the queen-bee depositing her eggs in those cells, which she did by placing the posterior part of her body in each of them. I continued on the watch most part of the ensuing days, but could discover nothing of what I had seen before.

"The eggs, after the fourth day, instead of changing in the manner of caterpillars, were found in the same state they were in the first day, except that some of them were covered with honey. But a very singular event happened the next day about noon: all the bees left their own hive, and were seen attempting to get into a neighbouring common hive, on the stool of which I found their queen dead, having, no doubt, been slain in the engagement. The manner in which I account for this event is as follows: the great desire of perpetuating their species, which is most observable in these insects, and to which end the concurrence of the males seems

seems so absolutely necessary, made them desert their own habitation where no males were left, in order to fix their residence in a new one, in which, there being a good stock of males, they might the better accomplish their purpose. If this does not yet establish the reader's faith of the necessity of the males bearing a share in the fecundation of the ova, the next experiment cannot, I presume, fail to convince him.

"I took the brood-comb which, as I observed before, had not been impregnated; I divided it into two parts; one I placed under a glass-bell N° 1. with honey-comb for the bees' food; I took care to leave a queen, but no drones, among the common bees I confined in it. The other piece of brood-comb I placed under another glass-bell N° 2. with a few drones, a queen, and a number of common bees proportioned to the size of the glass; the rest I disposed of as before. The result was, that in the glass N° 1. no impregnation happened; the eggs remained in the same state they were in when put into the glass; and, upon giving the bees their liberty on the seventh day, they all flew away, as was found to be the case in the former experiment: whereas in the glass N° 2. I saw, the very day after the bees had been put under it, the impregnation of the eggs by the drones in every cell containing eggs; the bees did not leave their hive on receiving their liberty; and, in the course of 20 days, every egg underwent all the above-mentioned necessary changes, and formed a pretty numerous young colony, in which I was not a little startled to find two queens.

"Fully satisfied concerning the impregnation of the eggs by the males, I desisted for the present from any further experiments on that head, being exceedingly anxious to endeavour to account for the presence of this new queen.

"I conjectured that either two queens, instead of one, must have been left among the bees I had placed under that glass; or else that the bees could, by some particular means of their own, transform a common subject into a queen. In order to put this to the test, I repeated the experiment with some variation. I got four glass-hives blown flat, which I thought preferable to the bell-shaped ones I had used before, as I could with those better examine what was going forward. I took a large brood-comb from an old hive, and, after having divided it into several pieces, I put some of them, containing eggs, worms, and nymphs, with food, viz: honey, &c. under each of the glasses; and confined within each a sufficient number of common bees, among which I left some drones, but took care that there should be no queen.

"The bees finding themselves without a queen, made a strange buzzing noise, which lasted near two days; at the end of which they settled and betook themselves to work: on the fourth day I perceived in each hive the beginning of a royal cell, a certain indication that one of the included worms would soon be converted into a queen. The construction of the royal cell being nearly accomplished, I ventured to leave an opening for the bees to get out; and found that they returned as regularly as they do in common hives, and shewed no inclination to desert their habitation. But, to be brief, at the end of twenty days, I observed four young queens among the new progeny.

"Correlating the result of these experiments to a mem-

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ber of this university, well conversant in the natural history of bees, he deemed it necessary, that they should be repeated, in order the better to establish the truth of a fact seemingly so improbable, that the eggs destined by nature to produce neutral or common bees, should be transformed into females or queens. He started an objection, that the queen-bee of a hive, besides the eggs which she deposits in the royal cells, might also have laid royal or female eggs either in the common cells, or indiscriminately throughout the different parts of the hive. He further supposed, that in the pieces of brood-comb, which had been successfully employed in the last experiments for the production of a queen, it had constantly happened, that one or more of these royal eggs, or rather the worms proceeding from them, had been contained.

"But the force of his objection was removed soon after by the same success having attended a number of other experiments, an account of which would take up too much room here; and he was at last brought to admit, that the working-bees are invested with a power of raising a common subject to the throne, when the community stands in need of a queen; and that accordingly every worm of the hive is capable, under certain circumstances, of becoming the mother of a generation: that it owes its metamorphosis into a queen, partly to the extraordinary size of the cell, and its particular position in it; but principally to a certain nourishment appropriated to the occasion, and carefully administered to it by the working-bees while it is in the worm-state, by which, and possibly other means as yet unknown, the development and expansion of the germ of the female organs, previously existing in the embryos, is effected, and those differences in its form and size are produced, which afterwards so remarkably distinguish the queen from the common working-bees. And finally it appears evident, from the experiments made by Mr Schirach and myself, that the received opinion, that the queen lays a particular kind of eggs, appropriated to the production of other queens, is erroneous.

"I shall now beg leave to point out the advantage that may accrue to the public from these observations, which is that of forming artificial swarms or new colonies; or, in other words, of furnishing the means to bring on a numerous increase of those useful insects: an object of some importance to this kingdom, as being the only means to prevent the annual exportation of considerable sums in the purchase of wax, a great quantity of which is lost every season for want of keeping up a sufficient stock of bees to collect it.

"The practice of this new art, Mr Schirach tells us, has already extended itself through Upper Lusatia, the Palatinate, Bohemia, Bavaria, Silesia, and even in Poland. In some of those countries it has excited the attention and patronage of government; and even the empress of Russia has thought it of such importance, that she has sent a person to Klein Baatzon, to be instructed in the general principles, and learn all the minutiae of this new art."

BEE is also used figuratively to denote sweetness, industry, &c. Thus Xenophon is called the *Attic bee*, on account of the great sweetness of his style. Antonius got the denomination *Melissa* or *Bee*, on account of his collection of common-places.—Leo Allatius gave

Bee

Beer.

the appellation *apes urbanae* to the illustrious men at Rome from the year 1630 to the year 1632.

BEE'S-BREAD. See *AVIS*, n° 12. par. ult.

BEE-Eaters, in zoology. See *MEROPS*.

BEE-Flower. See *OPHRYS*.

BEE-Glue, called by the ancients *propolis*, is a soft, unctuous, glutinous matter, employed by bees to cement the combs to the hives, and to close up the cells *.

BEE-Hiver. See *AVIS*, n° 19, 28, 30.

BEECH-TREE, in botany. See *FAGUS*.

BEECH-Mast, the fruit of the beech-tree, said to be good for fattening hogs, deer, &c.—It has sometimes, even to men, proved an useful substitute for bread. Chios is said to have endured a memorable siege by means of it.

BEECH-Oil, an oil drawn by expression from the mast of the beech-tree, after it has been shelled and pounded. This oil is very common in Picardy, and used there and in other parts of France instead of butter; but most of those who take a great deal of it, complain of pains and a heaviness in the stomach.

BEEF, the flesh of black-cattle prepared for food. According to Dr Cullen *, beef, though of a more firm texture and less soluble than mutton, is equally calefactive, perspirable, and nutritious: and if in the southern countries it is not esteemed so, it is on account of its imperfection there.

BEELE, a kind of pick-ax, used by the miners for separating the ores from the rocks in which they lie: this instrument is called a *tubber* by the miners of Cornwall.

BEER, is a spirituous liquor made from any farinaceous grain, but generally from barley. It is, properly speaking, the wine of barley. The meals of any of these grains being extracted by a sufficient quantity of water, and remaining at rest in a degree of heat requisite for the spirituous fermentation, naturally undergo this fermentation, and are changed into a vinous liquor. But as all these matters render the water mucilaginous, fermentation proceeds slowly and imperfectly in such liquors. On the other side, if the quantity of farinaceous matter be so diminished that its extract or decoction may have a convenient degree of fluidity, this liquor will be impregnated with so small a quantity of fermentable matter, that the beer or wine of the grain will be too weak, and have too little taste.

These inconveniences are remedied by preliminary operations which the grain is made to undergo.—These preparations consist in steeping it in cold water, that it may soak and swell to a certain degree; and in laying it in a heap with a suitable degree of heat, by means of which, and of the imbibed moisture, a germination begins, which is to be stopped by a quick drying, as soon as the bud shews itself. To accelerate this drying, and render it more complete, the grain is slightly roasted, by making it pass down an inclined canal sufficiently heated. This germination, and this slight roasting, changes considerably the nature of the mucilaginous fermentable matter of the grain.* The germination attenuates much, and in some measure totally destroys, the viscosity of the mucilage; and it does this, when not carried too far, without depriving the grain of any of its disposition to ferment. On the contrary, it changes the grain into a saccharine substance, as may be perceived by mashing grains beginning to germinate. The slight roasting contributes also to attenuate

the mucilaginous fermentable matter of the grain. When the grain is thus prepared, it is fit to be ground, and to impregnate water with much of its substance without forming a glue or viscous mass. The grain thus prepared is called *malt*. This malt is then to be ground; and all its substance, which is fermentable and soluble in water, is to be extricated by means of hot water. This extract or infusion is sufficiently evaporated by boiling in caldrons; and some plant of an agreeable bitterness, such as hops, is at that time added, to lighten the taste of the beer, and to render it capable of being longer preserved. Lastly, this liquor is put into casks, and allowed to ferment; nature performs the rest of the work, and is only to be assisted by the other most favourable circumstances for the spirituous fermentation. See *FERMENTATION*.

Foreigners have framed divers conjectures to account for the excellency of the British beer, and its superiority to that of other countries, even of Bremen, Mons, and Rostock. It has been pretended, our brewers throw dead dogs flea'd into their wort, and boil them till the flesh is all consumed. Others, more equitable, attribute the excellency of our beer to the quality of our malt and water, and the skill of our brewers in preparing it.

Our beer may be reformed divers ways; as by salt made of the ashes of barley-straw, put into the vessel, and stirred; or by three or four handfuls of beech-ashes thrown into the vessel, and stirred; or, where the liquor is not very sour, by a little put in a bag, without stirring: chalk calcined, oyster-shells, egg-shells burnt, sea-shells, crabs eyes, calcined coral, &c. do the same, as they imbibe the acidity, and unite with it into a sweetness.—Beer, it is said, may be kept from turning sour in summer, by hanging into the vessel a bag containing a new-laid egg, pricked full of little pin-holes, some laurel-berries, and a few barley-grains; or by a new-laid egg and walnut-tree leaves. Glauber commends his sal mirabile and fixed nitre, put in a linen bag, and hung on the top of the cask to as to reach the liquor, not only for recovering sour beer, but preserving and strengthening it.

Laurel-berries, their skin being peeled off, will keep beer from *deadness*; and beer already dead may be restored by impregnating it with fixed air *.

Beer *tasting of the cask* may be freed from it by putting a handful of wheat in a bag, and hanging it in the vessel.

BEESTINGS, or **BREASTINGS**, a term used by country-people for the first milk taken from a cow after calving.—The beestings are of a thick consistence, and yellow colour, seeming impregnated with sulphur. Dr Morgan imagines them peculiarly fitted and intended by nature to cleanse the young animal from the recrements gathered in its stomach and intestines during its long habitation *in utero*. The like quality and virtue he supposes in women's first milk after delivery; and hence infers the necessity of the mother's suckling her own child, rather than committing it to a nurse whose first milk is gone.

BEET, in botany. See *BETA*.

BEE-TLE, in the history of insects. See *SCARABÆUS*.

BEE-TLE also denotes a wooden instrument for driving piles, &c. It is likewise called a *flamper*, and by

* See *AVIS*,
n° 13.

* Left on
Mat. Med.

Bee
Bee

* See
n° 50

paviors a rammer.

BÉFORT, a small but strong town of France, and capital of Suintgaw in Alsace. It was ceded to France, by the treaty of Westphalia in 1648. There are not above 100 houses in this town, but it is important on account of the great road by this place from Franche Compté. The fortifications were greatly augmented by Lewis XIV. It is seated at the foot of a mountain. E. Long. 6. 2. N. Lat. 47. 38.

BEG, or **BEY**, in the Turkish affairs. See **BEY**.

Beg is more particularly applied to the lord of a banner, called also in the same language *sangiac-beg*. A beg has the command of a certain number of the spahis, or horse, maintained by the province under the denomination of *timariots*. All the begs of a province obey one governor-general called *begler-beg*, or *begler-beg*, q. d. lord of lords, or of the beys of the province.

BEGS, or **BECHS**, of Egypt, denote twelve generals, who have the command of the militia or standing forces of the kingdom; and are to secure the country from the insults of Arabs, as well as to protect the pilgrims in their annual expeditions to Mecca. The begs, several of whom are descended from the ancient race of the Mamalukes, are very rich and powerful, maintaining each 500 fighting men for their own guard, and the service of their court. On discontents, they have frequently risen in rebellion. They are often at variance with the bashaw, whom they have more than once plundered and imprisoned.

BEGHARDS. See **BEGUARDS**.

BEGLERBEG, a governor of one of the principal governments in the Turkish empire, and next in dignity to the grand vizier. To every beglerbeg the grand signior gives three ensigns or slaves, trimmed with a horse-tail; to distinguish them from the bashaws, who have but two; and from simple begs, or sangiac begs, who have but one.

The province or government of beglerbeg is called *beglerbeglik*, or *beglierbeglik*. These are of two sorts; the first called *bahulo beglerbeglik*, which have a certain rent assigned out of the cities, countries, and signories allotted to the principality; the second called *salianæ beglerbeglik*, for maintenance of which is annexed a salary or rent, collected by the grand signior's officers with the treasure of the empire. The beglerbegs of the first sort are in number 22, viz. those of Anatolia, Caramania, Diarbekir, Damascus, Aleppo, Tripoli, Trebizond, Buda, Temiswar, &c. The beglerbegs of the second sort are in number six, viz. those of Cairo, Babylon, &c. Five of the beglerbegs have the title of *viziers*, viz. those of Anatolia, Babylon, Cairo, Romania, and Buda.

The beglerbegs appear with great state, and a large retinue, especially in the camp, being obliged to bring a soldier for every 5000 aspers of rent which they enjoy. Those of Romania brought 10,000 effective men into the field.

The beglerbegs are become almost independent, and have under their jurisdiction several sangiacs or particular governments, and begs, agas, and other officers who obey them.

BEGUARDS, or **BEGHARDS**, religious of the third order of St Francis in Flanders. They were established at Antwerp in the year 1228, and took St Begghie for their patroness, whence they had their name.

From their first institution they employed themselves in making linen cloth, each supporting himself by his own labour, and united only by the bonds of charity, without having any particular rule. But, when Pope Nicolas IV. had confirmed that of the third order of St Francis, in 1289, they embraced it the year following. They were greatly favoured by the dukes of Brabant, particularly John II. and John III. who exempted them from all contributions and taxes. In the year 1425, they began to live in common, and made solemn vows in 1467, after having taken the habit of the Tertiaries (or religious of the third order of St Francis) of Liege. At last, in 1472, they became subject to the general of the congregation of Zepperen in the diocese of Liege, to which they were united by Pope Sixtus IV. As the convent of Antwerp is since become very considerable, the name of *Beguards* has been given to all the other religious of the same congregation. But, in 1650, Pope Innocent X. having suppressed the general of the congregation of Zepperen, all the convents of the third order of St Francis, in the dioceses of Liege, Malines, and Antwerp, were submitted to the visitation, jurisdiction, and correction, of the general of Italy, and erected into a province, under the title of the province of Flanders. This province has at present 10 or 12 convents, the principal of which are those of Antwerp, Brussels, Maestricht, and Louvain.

BEGUINES, a congregation of religious or nuns founded either by St Begghie, founder likewise of the Beguards, or by Lambert le Begue; of whom the former died about the end of the seventh century, the latter about the end of the 12th. They were established first at Liege, and afterwards at Neville, in 1207; and from this last settlement sprang the great number of Beguinages, which are spread over all Flanders, and which have passed from Flanders into Germany. In the latter country, some of these religious fell into extravagant errors, persuading themselves that it was possible, in the present life, to arrive at the highest perfection, even to impeccability, and a clear view of God; in short, to so eminent a degree of contemplation, that there was no necessity, after this, either to observe the falls of the church, or submit to the direction and laws of mortal men. The council of Vienna, in 1113, condemned these errors, and abolished the order of Beguines; permitting, nevertheless, those among them, who continued in the true faith, to live in chastity and penitence, either with or without vows. It is by favour of this latter clause, that there still subsist so many communities of Beguines in Flanders; who, since the council of Vienna, have conducted themselves with so much wisdom and piety, that Pope John XXII. by his decretal, which explains that of his predecessor made in the council of Vienna, took them under his protection; and Boniface VIII. in another, exempted them from the secular tribunal, and put them under the jurisdiction of the bishops.

There is scarce a town in the Low-Countries, in which there is not a society of Beguines; and, notwithstanding the change of religion at Amsterdam, there is a very flourishing one in that city. These societies consist of several houses placed together in one inclosure, with one or more churches, according to the number of Beguines. There is in every house a

Beheading
Behn.

priores, or mistresses, without whose leave they dare not stir out. They make a sort of vow, which is conceived in the following terms: "I. N. promise to be obedient and chaste as long as I continue in this Beguinage." They observe a three years novitiate before they take the habit. The rector of the parish is superior of the Beguinage; and he does nothing without the advice of eight Beguines. They were formerly habited in different manners; some in grey, others in blue; but at present they all wear black. When they go abroad, in Amsterdam, they put on a black veil. Formerly they had as many different statutes as there were societies. In the visitations of the year 1600 and 1601, by the archbishop Matthias Hovius, they were forbidden, under the penalty of a fine, to have lap-dogs. The finest Beguinage in Flanders is that of Malines. That of Antwerp likewise is very spacious, and has two separate churches.

BEHEADING, a capital punishment, inflicted by cutting off the head with an ax, sword, &c.

Among the Romans, beheading was a military punishment, performed at first with an ax, but afterwards with a sword, as done at present in Holland and France. In England the ax is preferred; and in Scotland they use for this purpose a machine called a *maiden*. See **MAIDEN**.

* See Hippopotamus.

BEHEMOTH, the hippopotamus, or river-horse*.

BEHEN, in botany. See **CUCUBALUS**.

BEHN (Aphara), a celebrated authoress, descended from a good family in the city of Canterbury, was born some time in Charles I.'s reign, but in what year is uncertain. Her father's name was *Johnson*, who through the interest of the lord Willoughby, to whom he was related, being appointed lieutenant-general of Surinam, and 36 islands, undertook a journey to the West-Indies, taking with him his whole family, among whom was our poetess, at that time very young. Mr Johnson died in the voyage; but his family reaching Surinam, settled there for some years. Here it was that she learned the history of, and acquired a personal intimacy with, the American prince Oroonoko and his beloved Imoinda, whose adventures she hath so pathetically related in her celebrated novel of that name, and which Mr Southerne afterwards made such an admirable use of in making it the ground-work of one of the best tragedies in the English language.

On her return to London, she became the wife of one Mr Behn, a merchant, residing in that city, but of Dutch extraction. How long he lived after their marriage, is not very apparent, probably not very long; for her wit and abilities having brought her into high estimation at court, king Charles II. fixed on her as a proper person to transact some affairs of importance abroad during the course of the Dutch war. To this purpose she went over to Antwerp, where, by her intrigues and gallantries, she so far crept into the secrets of state, as to answer the ends proposed by sending her over. Nay, in the latter end of 1666, she, by means of the influence she had over one Vander Albert, a Dutchman of eminence, whose heart was warmly attached to her, she wormed out of him the design formed by De Ruyter, in conjunction with the family of the De Wits, of sailing up the Thames and burning the English ships in their harbours, which they afterwards put in execution at Rochester. This she immediately communicated to

the English court: but though the event proved her intelligence to be well grounded, yet it was at that time only laughed at; which, together probably with no great inclination shewn to reward her for the pains she had been at, determined her to drop all further thoughts of political affairs, and during the remainder of her stay at Antwerp to give herself up entirely to the gaiety and gallantries of the place. Vander Albert continued his addresses, and after having made some unsuccessful attempts to obtain the possession of her person on easier terms than matrimony, at length consented to make her his wife; but while he was preparing at Amsterdam for a journey to England with that intent, a fever carried him off, and left her free from any amorous engagements. In her voyage back to England, she was very near being lost, the vessel she was in being driven on the coast by a storm; but happening to founder within sight of land, the passengers were, by the timely assistance of boats from the shore, all fortunately preserved.

From this period she devoted her life entirely to pleasure and the muses. Her works are extremely numerous, and all of them have a lively and amorous turn. It is no wonder then that her wit should have gained her the esteem of Mr Dryden, Southerne, and other men of genius, as her beauty, of which in her younger part of life she possessed a great share, did the love of those of gallantry. Nor does she appear to have been any stranger to the delicate sensations of that passion, as appears from some of her letters to a gentleman, with whom she corresponded under the name of Lycida, and who seems not to have returned her flame with equal ardor, or received it with that rapture her charms might well have been expected to command.

She published three volumes of Miscellaneous Poems; two volumes of Histories and Novels; translated Fontenelle's *Plurality of Worlds*, and annexed a *Criticisms* on it; and her *Plays* make four volumes. In the dramatic line, the turn of her genius was chiefly to comedy. As to the character her plays should maintain in the records of dramatic history, it will be difficult to determine, since their faults and perfections stand in strong opposition to each other. In all, even the most indifferent of her pieces, there are strong marks of genius and understanding. Her plots are full of business and ingenuity, and her dialogue sparkles with the dazzling lustre of genuine wit, which every where glitters among it. But then she has been accused, and that not without great justice, of interlarding her comedies with the most indecent scenes, and giving an indulgence in her wit to the most indelicate expressions. To this accusation she has herself made some reply in the Preface to the *Lucky Chance*; but the retorting the charge of prudery and preciseness on her accusers, is far from being a sufficient exculpation of herself. The best and perhaps the only true excuse that can be made for it is, that, as she wrote for a livelihood, she was obliged to comply with the corrupt taste of the times.

After a life intermingled with numerous disappointments, she departed from this world on the 16th of April 1689, and lies interred in the cloysters of Westminster-Abbey.

BEJA, an ancient town of Portugal, in the province of Alentejo. It is seated in a very agreeable and fruitful plain, remarkable for excellent wine. There are three

Behn.

three gates remaining, which are of Roman architecture, and a great many Roman antiquities are dug out of the earth. The town has a strong castle for its defence, and is situated W. Long. 7. 20. N. Lat. 37. 58. It was taken from the Moors in 1162.

BEJAR, a town of Estremadura in Spain, famous for its baths. It is seated in a very agreeable valley surrounded with high mountains whose tops are always covered with snow. Here the dukes of Bejar have an handsome palace. In this neighbourhood are forests filled with game, and watered by fine springs; also a lake abounding with excellent fish, particularly trouts. They pretend that this lake makes such a noise before a storm, that it may be heard 15 miles off.

BEICHLINGEN, a town of Thuringia in Upper Saxony, in E. Long. 11. 50. N. Lat. 51. 20.

BEILA, a town of Italy, in Piedmont. E. Long. 7. 45. N. Lat. 45. 2.

BEILSTEIN, a town of the landgraviate of Hesse in Germany, in E. Long. 8. 0. N. Lat. 50. 30.

BEINHEIM, a fort of Alsace in France, seated on the river Sur, near its confluence with the Rhine, in E. Long. 8. 12. N. Lat. 45. 2.

BEIRA, a province of Portugal, bounded on the west by the ocean, on the south by the Portuguese Estremadura, on the south-east by the Spanish province of the same name, on the east by the province of Trallos Montos, and on the north by the river Douro. It extends in length about 34 leagues, and in breadth about 30 leagues, and is divided into six commarcas. Within this province lies Lamego, where the first assembly of the states was held; the chief episcopal city of Coimbra, or Coimbra, which is likewise an university; and Viseo, also a bishopric, and formerly the capital of a dukedom. The country is equally agreeable and fruitful, producing corn, wines, &c. in abundance, and the hills affording excellent pasture to cattle and sheep. The settled militia consists of about 10,000 men.

BEIRAM, or BAIKAM. See BAIKAM.

BEIZA, or BEIZATH, in Hebrew antiquity, a word signifying an egg; as also a certain measure in use among the Jews. The beiza was likewise a gold coin, weighing 40 drachms, among the Persians, who gave out, that Philip of Macedon owed their king Darius 1000 beizaths or golden eggs, for tribute-money; and that Alexander the Great refused to pay them, saying, that the bird which laid these eggs was flown into the other world.

BEK (David), a famous Dutch portrait painter, and disciple of Vandeyk; whose skill in his profession, and politeness of address, acquired him high esteem in most courts of Europe. He was in great favour with Charles I. king of England, and taught the principles of drawing to his sons Charles and James. He went afterward into the service of the kings of France, Denmark, and of Christina queen of Sweden, who made him first gentleman of her bedchamber. His manner of painting was so quick, that our king Charles told him, he believed he could paint if he was riding post. It is said, that in travelling through Germany, he fell sick at an inn, and was laid out for dead. His servants drinking for consolation by his bed-side, one of them in a drunken freak said, "Our master was fond of a glass while he was alive, and out of gratitude let us give him a glass now when he is dead." The propofal

proving agreeable, he raised up his master's head, and endeavouring to pour some wine into his mouth, Bek opened his eyes; and being compelled, nevertheless, to drink the glass-full, gradually revived. He lived some years after, though he died at 35 years old, in 1656.

BEKKER (Balthazar), one of the most famous Dutch divines, and author of the celebrated book, *The World bewitched*, an ingenious piece, against the vulgar notion of spirits. This raised a terrible clamour against him. He was deposed from the office of minister; but the magistrates of Amsterdam continued him his pension. He died in 1698.

BEL (MATTHIAS), was born in Hungary, and became a Lutheran minister at Presburg, and historiographer to the emperor Charles VI. He wrote, among other works, a *History of Hungary*, which was so much admired, that the emperor sent him letters of nobility; and notwithstanding his being a Lutheran, the pope, in 1736, sent him his picture, and many large gold medals. He was a member of the Royal Society of London, and of the academies of Berlin and Peterfburg; and died in 1749, at 66 years of age.

BEL, or Belus, the supreme god of the ancient Chaldeans or Babylonians. He was the founder of the Babylonian empire; and is supposed to be the Nimrod of Scripture, and the same as the Phœnician Baal. This god had a temple erected to him in the city of Babylon, on the very uppermost range of the famous tower of Babel, or Babylon, wherein were many statues of this deity; and one, among the rest, of massy gold, 40 feet high. The whole furniture of this magnificent temple was of the same metal, and valued at 800 talents of gold.—This temple, with its riches, was in being till the time of Xerxes, who, returning from his unfortunate expedition into Greece, demolished it, and carried off the immense wealth which it contained. It was the statue of this god which Nebuchadnezzar, being returned to Babylon after the end of the Jewish war, set up and dedicated in the plain of Dura; the story of which is related at large in the third chapter of Daniel.

BEL and the Dragon (the history of); an apocryphal, and uncanonical, book of Scripture. It was always rejected by the Jewish church, and is extant neither in the Hebrew nor the Chaldee language, nor is there any proof that it ever was so. St Jerom gives it no better title than the *fable of Bel and the Dragon*. It is however permitted to be read, as well as the other apocryphal writings, for the instruction and improvement of manners.

BELAC, a small city of France, in the province of the Lyonnais, and district of La Marche. E. Long. 1. 15. N. Lat. 46. 15.

BELCASTRO, an episcopal city of Italy in the farther Calabria, and kingdom of Naples. It is seated on a mountain, in E. Long. 17. 15. N. Lat. 39. 6.

BELCHITE, a town of Spain, in the kingdom of Arragon, seated on the river Almonazir, in W. Long. 0. 30. N. Lat. 41. 19.

BELCHOE, a town of Ireland, in the province of Ulster, and county of Fermanagh, seated on Lough Nilly, in W. Long. 6. 6. N. Lat. 54. 2.

BELEM, a town of Estremadura in Portugal, about a mile from Lisbon. It is seated on the north side of the river Tajo, and is designed to defend the entrance

Bekker
||
Belem.

Belemnites
|
Beleſis.

to Liſbon; and here all the ſhips that ſail up the river muſt bring to. In this place they inter the kings and queens of Portugal.

BELEMNITES, vulgarly called *thunder-bolts* or *thunder-ftones*. They are compoſed of ſeveral cruſts of ſtone encircling each other, of a conical form, and various ſizes; uſually a little hollow, and ſomewhat transparent, formed of ſeveral ſtriae radiating from the axis to the ſurface of the ſtone; and when burnt or rubbed againſt one another, or ſcraped with a knife, yield an odour like raſped horn. Their ſize is various, from a quarter of an inch to eight inches; and their colour and ſhape differ. They are ſuppoſed to be originally either a part of ſome ſea-producción; or a ſtone formed in the cavity of ſome worm-shell, which, being of a tender and brittle nature, has perished, after giving its form to the ſtone. They are very frequently found in many parts of England; and the common people have a notion, that they are always to be met with after a ſtorm. They are often incloſed in, or adhere to, other ſtones; and are moſt frequent amongſt gravel, or in clay: they abound in Glouceſterſhire; and are found near Dedington in Oxfordſhire, where they ſometimes contain the ſilver marcasite. See Plate LV. fig. 10.

BELERIUM, (anc. geog.), a promontory of the Dumnonii or Damuonii, the weſtmoſt Britons. Now called the *land's end*, in Cornwall.

BELEſIS, or NANYBRUS, ſaid to have been the founder of the ancient Babylonish empire, and in conjunction with Arbaces the Mede to have put an end to the kingdom of the Aſſyrians by the defeat and death of Sardanapalus. This firſt prince is repreſented as a crafty and mean-ſpirited knave; and, at the ſame time, as nothing leſs than an hero. It is ſaid, he was baſe enough to circumvent Arbaces his colleague and friend in the moſt ſhameful manner; by pretending a vow he had, in the miſt of the war, made to his god Belus, That if ſucceſs was the event of it, and the palace of Sardanapalus was conſumed, as it was, he would be at the charge and trouble of removing the aſhes that were left, to Babylon; where he would heap them up into a mount near the temple of his god; there to ſtand as a monument to all who ſhould navigate the Euphrates, of the ſubverſion of the Aſſyrian empire. He, it ſeems, had been privately informed, by an eunuch, of the imenſe treaſure which had been conſumed in the conſagration at Nineveh; and, knowing it to be a ſecret to Arbaces, his avarice ſuggeſted to him this artifice. Arbaces not only granted him his requeſt; but appointed him king of Babylon, with an exemption from all tribute. Beleſis, by this artifice, carried a prodigious treaſure with him to Babylon; but when the ſecret was diſcovered, he was called to an account for it, and tried by the other chiefs who had been aſſiſtant in the war, and who, upon his confeſſion of the crime, condemned him to loſe his head. But Arbaces, a magnificent and generous prince, freely forgave him, left him in poſſeſſion of the treaſure, and alſo in the independant government of Babylon, ſaying, The good he had done ought to ſerve as a veil to his crime; and thus he became at once a prince of great wealth and dominion.

In proceſs of time, and under the ſucceſſor of Arbaces, he became a man of dreſs, ſhew, and effeminacy, unworthy of the kingdom or province he held. Nany-

brus, for ſo we muſt now call Beleſis, underſtanding a certain robuſt Mede, called *Parſondas*, held him in the utmoſt contempt, and had ſolicited the emperor of the Medes to diſturb him of his dominions, and to confer them upon himſelf, offered a very great reward to the man who ſhould take Parſondas, and bring him to him. Parſondas, hunting ſomewhere near Babylon with the king of the Medes, and ſtraggling from the company, happened to fall in with ſome of the ſervants of the Babylonian Nanybrus, who had been tempted with the promiſed reward. They were purveyors to the king; and Parſondas being very thirſty, aſked them for a draught of wine, which they not only granted, but prevailed upon him to take a meal with them. As he drank freely, ſuſpecting no treachery, he was eaſily perſuaded to paſs that night in company with ſome beautiful women, brought on purpoſe to detain him. But, while he was in a profound ſleep, the ſervants of Nanybrus ruſhing upon him, bound him, and carried him to their prince; who bitterly reproached him for endeavouring to eſtrange his maſter the king of the Medes from him, and by that means place himſelf in his room on the throne of Babylon. Parſondas did not deny the charge; but with great intrepidity owned, that he thought himſelf more worthy of a crown than ſuch an indolent and effeminate prince as he was. Nanybrus, highly provoked at the liberty he took, ſwore by the gods Belus and Molis, or rather Mylitta, that Parſondas himſelf ſhould in a ſhort time become ſo effeminate as to reproach none with effeminacy. Accordingly, he ordered the eunuch who had the charge of his muſic-women, to ſhave, paint, and dreſs him after the manner of thoſe women, to teach him the art, and in ſhort to transform him by all poſſible means into a woman. His orders were obeyed; and the manly Parſondas ſoon exceeded the faireſt female in ſinging, playing, and the other arts of allure-ment.

In the mean time the king of the Medes, having in vain fought after his favourite ſervant, and in vain offered great rewards to ſuch as ſhould give him any information concerning him, concluded he had been deſtroyed by ſome wild beaſt in the chace. At length, after ſeven years, the Mede was informed of his ſtate and condition by an eunuch, who, being cruelly ſcourged by Nanybrus's order, ſled, at the inſtigatiſon of Parſondas, into Media; and there diſcloſed the whole to the king, who immediately diſpatched an officer to demand him. Nanybrus pretended to know nothing of any ſuch perſon; upon which, another officer was ſent by the Mede, with a peremptory order to ſeize on Nanybrus if he perſiſted in the denial, to bind him with his girdle, and lead him to immediate execution. This order had the deſired effect: the Babylonian owned what he had before denied, promiſing to comply, without further delay, with the king's demand; and in the mean time invited the officer to a banquet, at which 150 women, among whom was Parſondas, made their appearance, ſinging and playing upon various inſtruments. But, of all, Parſondas appeared by far the moſt charming; inſomuch that Nanybrus inquiring of the Mede, which he liked beſt, he immediately pointed at him. At this the Babylonian clapt his hands; and, falling into an immoderate fit of laughter, told him who the perſon was whom he thus preferred to all the reſt;

refit; adding, that he could answer what he had done before the king of the Medes. The officer was no less surpris'd at such an astonishing change, than his matter was afterwards, when Parfondas appear'd before him. The only favour Parfondas begged of the king, for all his past services, was, that he would avenge on the Babylonian the base and highly injurious treatment he had met with at his hands. The Mede march'd accordingly, at his instigation, to Babylon; and, notwithstanding the remonstrances of Nanybrus, urging, that Parfondas had, without the least provocation, endeavoured to deprive him of both his life and kingdom, declar'd that in ten days time he would pass the sentence on him which he deserved, for presuming to act as judge in his own cause, instead of appealing to him. But Nanybrus having in the mean time gain'd with a large bribe Mitraphernes the Mede's favourite eunuch, the king was by him prevail'd upon to sentence the Babylonian only to a fine; which made Parfondas curse the man who first found out gold, for the sake of which he was to live the sport and derision of an effeminate Babylonian.

BELLESME, a town of Perche in France, in W. Long. 6. 16. N. Lat. 48. 23.

BELEZERO, a town of Russia, and capital of a province of the same name. It is situated on the south-east shore of the White sea, in E. Long. 36. 10. N. Lat. 61. 50.

BELFAST, a town of Ireland, in the county of Antrim. It is seated at the bottom of Carrickfergus bay, and is the chief town and port in this part of Ireland, as well for beauty and the number of its inhabitants, as for its wealth, trade, and shipping. It has a considerable trade with Glasgow, and the inhabitants are mostly Scots, and of the presbyterian religion. W. Long. 6. 15. N. Lat. 54. 38.

BELFRY, that part of a steeple where bells are hung, or the timber frame whereby they are supported.

BELGARDEN, a town of Germany, in East Pomerania, in the province of Cassubia, and subject to Prussia. E. Long. 16. 5. N. Lat. 54. 10.

BELGOROD, a town of Russia, and capital of a province of the same name. It is seated on the river Donnets, in E. Long. 18. 5. N. Lat. 51. 20.

BELGOROD, a strong town of Bessarabia in European Turkey, seated at the mouth of the river Niester, on the Black sea, 80 miles south-east of Bender. E. Long. 31. 0. N. Lat. 46. 30.

BELGRADE, a city of Turkey in Europe, and capital of Servia, seated at the confluence of the Save and the Danube, in E. Long. 21. 2. N. Lat. 45. 10. The Danube is very rapid near this city, and its waters look whitish. Belgrade is built on a hill, and was once large, strong, and populous; it was surrounded with a double wall, flank'd with a great number of towers, and had a castle situated on a rising ground, and built with square stones. The suburbs are very extensive; and resort'd to by Turkish, Jewish, Greek, Hungarian, and Slavonian merchants. The streets where the greatest trade is carried on are covered with wood, to shelter the dealers from the sun and rain. The rivers render it very convenient for commerce; and as the Danube falls into the Black-sea, the trade is easily extended to distant countries, which renders it the staple town in these parts; and as the Danube runs up to

Vienna, they send goods from thence with a great deal of ease. The Armenians have a church here, and the Jews a synagogue, both these being employed as factors: the shops are but small; and the sellers sit on tables, disposing of their commodities out of a window, for the buyers never go on the inside. The richest merchandize are expos'd to sale in two bezeleins or bazars, built crosswise. There are two exchanges, built with stone, and supported with pillars not unlike the Royal Exchange at London. There is likewise a caravanserai or public inn, and a college for young students. It has been taken by the Turks and Imperialists alternately several times; but was ceded to the Turks in 1739, and the fine fortifications demolished.

BELGRADO, a town of Friuli in the Venetian territories in Italy. It stands near the river Tejamento, in E. Long. 13. 5. N. Lat. 46. 0.

BELIA, (anc. geog.) a town of lither Spain, now *Bolivia*, in the kingdom of Arragon. See **BELCHITE**.

BELIDOR (Bernard Forest de), a Catalonian engineer in the service of France, and member of the academies of sciences at Paris and Berlin, and of the royal society at London: A celebrated mathematician, and author of a number of military tracts in which the science of mathematics is applied to military uses. Died in 1765, aged 70.

BELIEF, the assent of the mind to the truth of any proposition *.

BELISARIUS, general of the emperor Justinian's army, who overthrew the Persians in the East, the Vandals in Africa, and the Goths in Italy. But after all his great exploits, being falsely accused of a conspiracy against the emperor, he unworthily put out his eyes. After that, Belisarius is reported to have begg'd at a little but erected for him by the road side, addressing passengers, *Date obulum Belisario!* But some say he was restored to his honours; others that he died in peace at Constantinople 565.

BELL, a well known machine rank'd by musicians among the musical instruments of percussion.

The constituent parts of a bell are, the body or *barrel*, the *clapper* on the inside, and the ear or *campan* by which it hangs to a large beam of wood. The matter of which it is usually made is a composition called *bell-metal*; (See **CHEMISTRY**, n° 379). The thickness of a bell's edges is usually $\frac{1}{4}$ of the diameter, and its height 12 times its thickness. The bell-founders have a diapason, or bell-scale, wherewith they measure the size, thickness, weight, and tone, of their bells. For the method of casting bells, see **FOUNDERY**.

The sound of a bell is conjectured to consist in a vibratory motion of its parts, much like that of a musical chord. The stroke of the clapper must necessarily change the figure of the bell, and of a round make it oval: but the metal having a great degree of elasticity, that part will return back again which the stroke drove farthest off from the centre, and that even some small matter nearer the centre than before; so that the two parts which before were extremes of the longest diameter, do then become those of the shortest; and thus the external surface of the bell undergoes alternate changes of figure, and by that means gives that tremulous motion to the air in which the sound consists. M. Perrault maintains, that the sound of the same bell, or chord, is a compound of the sounds of the several parts thereof, so that

Belgrado
Bell.

* See Metaphysics, sect. xxxviii. xxxix.

Bell.

that where the parts are homogeneous, and the dimensions of the figure uniform, there is such a perfect mixture of all these sounds as constitutes one uniform, smooth, even sound; and the contrary circumstances produce harshness. This he proves from the bells differing in tone according to the part you strike; and yet strike it any where, there is a motion of all the parts. He therefore considers bells as a compound of an infinite number of rings, which according to their different dimensions have different tones, as chords of different lengths have; and when struck, the vibrations of the parts immediately struck determine the tone, being supported by a sufficient number of consonant tones in the other parts.

Bells are observed to be heard further, placed on plains than on hills; and still further in valleys, than on plains: the reason of which will not be difficult to assign, if it be considered that the higher the sonorous body is, the rarer is its medium; consequently, the less impulse it receives, and the less proper vehicle it is to convey it to a distance.

Mr Reamur, in the memoirs of the Paris academy, has the following observation relating to the shape most proper for bells, to give them the loudest and clearest sound. He observes, "that as pots and other vessels more immediately necessary to the service of life were doubtless made before bells, it probably happened that the observing these vessels to have a sound when struck, gave occasion to making bells, intended only for sound, in that form; but that it does not appear that this is the most eligible figure; for lead, a metal which is, in its common state, not at all sonorous, yet becomes greatly so on its being cast into a particular form, and that very different from the common shape of bells. In melting lead for the common occasions of casting in small quantities, it is usually done in an iron ladle; and as the whole is seldom poured out, the remainder, which falls to the bottom of the ladle, cools into a mass of the shape of that bottom. This is consequently a segment of a sphere, thickest in the middle, and thinner towards the edges: nor is the ladle any necessary part of the operation, since if a mass of lead be cast in that form in a mould of earth or sand, in any of these cases it is found to be very sonorous. Now if this shape alone can give sound to a metal which in other forms is perfectly mute, how much more must it necessarily give it to other metals naturally sonorous in whatever form? It should seem, that bells would much better perform their office in this than in any other form; and that it must particularly be a thing of great advantage to the small bells of common house-clocks, which are required to have a shrill note, and yet are not allowed any great size." He adds, "that had our forefathers had opportunities of being acquainted with the sound of metals in this shape, we should probably have had all our bells at present of this form."

The use of bells is very ancient, as well as extensive. We find them among Jews, Greeks, Romans, Christians, and Heathens, variously applied; as on the necks of men, beasts, birds, horses, sheep; but chiefly hung in buildings, either religious, as in churches, temples, and monasteries; or civil, as in houses, markets, baths; or military, as in camps and frontier towns.

Among the Greeks, those who went the nightly rounds in camps or garrisons, carried with them a

little bell, which they rung at each centry-box to see that the soldiers on watch were awake. A codonophorus or bell-man also walked in funeral processions, at a distance before the corps, not only to keep off the crowd, but to advertise the *flamen dialis* to keep out of the way, for fear of being polluted by the sight, or by the funeral music. The priest of Proserpine at Athens, called *hierophantus*, rung a bell to call the people to sacrifice.

There were also bells in the houses of great men to call up the servants in a morning. Zonaras assures us, that bells were hung with whips on the triumphal chariots of their victorious generals, to put them in mind that they were still liable to public justice.

Bells were put on the necks of criminals going to execution, that persons might be warned by the noise to get out of the way of so ill an omen as the sight of the hangman, or the condemned criminal, who was devoted and just going to be sacrificed to the *di manes*.

For bells on the necks of brutes, express mention is made of them in Phædrus,—*Gelsa cervicæ eminens, Clarumque collo jactans tintinnabulum*. Taking these bells away was contrived by the civil law, theft; and if the beast was lost by this means, the person who took away the bells was to make satisfaction.

Among the Jews, we find mention in scripture of bells made use of in the temple. Their figure is not known; but they were made of copper, and their sound was sharp and heard to a great distance. The high-priest had a great number of little golden bells hung to the border of his garment, to give notice when he entered into, and when he came out of, the sanctuary, and save him the trouble of knocking at the door. The prophet Zachary speaks of bells hung to the brides of war-horses, that thereby they might be accustomed to noise.

There are disputes about the number of bells which were intermixed with pomegranates on Aaron's garment. Some will have it only 12, others 50, others raise it to 66, others to 72, and some to 80. The kings of Persia are said to have had the like habit. We may add, that the Arabian ladies who are about the princes person, to serve and divert him, have little gold bells fastened to their legs, neck, and elbows, the motion of which, when they dance, makes an agreeable sort of harmony. The princesses of that country are also said to wear large hollow gold rings, filled with little flints, which found like bells when they walk. Sometimes also large circles, with little rings, hung round them, produce the same effect. Sometimes they wear a number of flat bobs fixed to the end of their hair, which is matted, and hangs long behind, serving to make a noise as often as they stir, and give notice of the mistress's passing by, that the servants may behave respectfully, and strangers retire, to avoid seeing the person who passes.

As to the origin of church-bells, Mr Whittaker * * H. J. observes, That bells being used, among other purposes, by the Romans to signify the times of bathing, were naturally applied by the Christians of Italy to denote the hours of devotion, and summon the people to church. The first application of them to this purpose is, by Polydore Virgil and others, ascribed to Paulinus bishop of Nola, a city of Campania, about the year 400. Hence, it is said, the names *nola* and *campana*

Bell

pana were given them; the one referring to the city, the other to the country. Though others say they took the latter of these names, not from their being invented in Campania, but because it was here the manner of hanging and balancing them, now in use, was first practised; at least that they were hung on the model of a sort of balance invented or used in Campania; for in Latin writers we find *campana statera*, for a steelyard; and in the Greek *ακαναλίον*, and *ponderare*, to weigh. In Britain, bells were applied to church-purposes, before the conclusion of the seventh century, in the monastic societies of Northumbria, and as early as the sixth even in those of Caledonia. And they were therefore used from the first erection of parish-churches among us.—Those of France and England appear to have been furnished with several bells. In the time of Clothair II. king of France, and in the year 610, the army of that king was frightened from the siege of the city of Sens, by ringing the bells of St Stephen's church. The second excerpt of Egbert, about the year 750, which is adopted in a French Capitulary of 801, commands every priest, at the proper hours, to sound the bells of his church, and then to go through the sacred offices to God. And the council of Enham, in 1011, requires all the mullets for sins to be expended in the reparation of the church, clothing and feeding the minister of God, and the purchase of church vestments, church-books, and church-bells. These were sometimes composed of iron in France; and in England, as formerly at Rome, were frequently made of brass. And as early as the ninth century, there were many cast of a large size and deep note.

Inguiphus mentions, that Turketulus abbot of Croyland, who died about the year 870, gave a great bell to the church of that abbey, which he named Guthlac; and afterwards six others, viz. two which he called *Burholmenus* and *Bettelin*, two called *Turketul* and *Tatwin*, and two named *Pega* and *Bega*, all which rang together; the same author says, *Non erat tunc tanta consonantia campanarum in tota Anglia*. Not long after, Kineus archbishop of York gave two great bells to the church of St John at Beverley, and at the same time provided that other churches in his diocese should be furnished with bells. Mention is made by St Aldhem, and William of Malmesbury, of bells given by St Dunstan to the churches in the west. The number of bells in every church gave occasion to the curious and singular piece of architecture in the campanile or bell-tower; an addition, which is more susceptible of the grander beauties of architecture than any other part of the edifice, and is generally therefore the principle or rudiments of it. It was the constant appendage to every parish-church of the Saxons, and is actually mentioned as such in the laws of Athelstan.

The Greek Christians are usually said to have been unacquainted with bells till the ninth century, when their confutation was first taught them by a Venetian. Indeed, it is not true that the use of bells was entirely unknown in the ancient eastern churches, and that they called the people to church, as at present, with wooden mallets. Leo Allatius, in his dissertation on the Greek temples, proves the contrary from several ancient writers. It is his opinion, that bells first began to be diffused among them, after the taking of Constantinople by the Turks; who, it seems, prohibited them, lest

their sound should disturb the repose of souls, which, according to them, wander in the air. He adds, that they still retain the use of bells in places remote from the intercourse of the Turks; particularly, very ancient ones in mount Athos. F. Simon thinks the Turks prohibited the Christians the use of bells, rather out of political than religious reasons; inasmuch as the ringing of bells might serve as a signal for the execution of revolts, &c.

In the ancient monasteries, we find six kinds of bells enumerated by Durandus, viz. *Squilla*, rung in the refectory; *cymbalum*, in the cloister; *nola*, in the choir; *nolula* or *dupla*, in the clock; *campana*, in the steeple; and *signum* in the tower. Belthus has much the same; only that for *squilla* he puts *tintinabulum*, and places the *campana* in the tower, and *campanella* in the cloister. Others place the *tintinabulum* or *tinnisium* in the refectory or dormitory; and add another bell called *corrigiuncula*, rung at the time of giving discipline, to call the monks to be flogged. The *cymbalum* is sometimes also said to have been rung in the cloister, to call the monks to meat.

In the funeral monuments of Weever, are the following particulars relating to bells: 'Bells had frequently these inscriptions on them:

' *Funera plango, Fulgura frango, Sabbata pargo,*
' *Excito lentos, Dissipo ventos, Peco cruentos.*

' In the Little Sanctuary at Westminster king Edward III. erected a clochier, and placed therein three bells for the use of St Stephen's chapel: about the biggest of them were cast in the metal these words:

' King Edward made mee thirte thousand weight and three.
' Take me down and wey mee, and more you shall fynd mee.
' But these bells being to be taken down in the reign of king Henry VIII. one writes underneath with a coale:

' But Henry the eight
' Will bait me of my weight.' *Ibid.* 492.

This last distich alludes to a fact mentioned by Stow in his survey of London, ward of Farringdon Within, to wit, that near to St Paul's school stood a clochier, in which were four bells called *Jesus' bells*, the greatest in all England, against which Sir Miles Partridge staked an hundred pounds, and won them of king Henry VIII. at a cast of dice. Nevertheless it appears that abroad there are bells of greater magnitude. In the steeple of the great church at Roan in Normandy is a bell with this inscription:

Je suis George de Ambois,
Qui treute cinque mille pois.
Nes hi qui me peçoit,
Treute six mill me trouera.
I am George of Ambois,
Thirte five thousand in pois:
But he that shall weigh me,
Thirte six thousand shall find me. *Ibid.*

And it is a common tradition that the bells of King's-college chapel, in the university of Cambridge, were taken by Henry V. from some church in France, after the battle of Agincourt. They were taken down some years ago, and sold to Phelps the bell-founder in White-Chapel, who melted them down.

The uses of bells were summed up in the following distich, as well as that first abovementioned:

Lauds Deum verum, plebem voco, confago clerum,
Defunctos ploro, pestem fugo, festo decoro.

Matthew Paris observes, that anciently the use of bells

bells was prohibited in time of mourning; though at present they make one of the principal ceremonies of mourning. Mabillon adds, that it was an ancient custom to ring the bells for persons about to expire, to advertise the people to pray for them; whence our ringing-bells. Lobineau observes, that the custom of ringing bells, at the approach of thunder, is of some antiquity; but that the design was not so much to shake the air, and so dissipate the thunder, as to call the people to church, to pray that the parish might be preserved from that terrible meteor.

In the times of Popery, bells were baptized and anointed *oleo chrismatis*: they were exorcised, and blessed by the bishop; from a belief, that, when these ceremonies were performed, they had power to drive the devil out of the air, to calm tempests, to extinguish fire, and to recreate even the dead. The ritual for these ceremonies is contained in the Roman pontifical; and it was usual in their baptism to give to bells the name of some saint. In Chauncy's history of Hertfordshire, page 383. is a relation of the baptism of a set of bells in Italy with great ceremony, a short time before the writing that book. The bells of the parish church of Winnington in Bedfordshire had their names cast about the verge of every one in particular, with these rhiming hexameters:

Nomina Campanis hec insita sunt quoque nostris.

1. Hec signum Petri pulsatur nomine Christi.

2. Nomina Magdalene campana sonat melode.

3. Sit nomen Domini benedictum semper in eum.

4. Maja Raphaelis sonat auribus immanuelis.

5. Sum Rosa pulsata mundique Maria vocata. Wcew. Fnn. 122.

By an old chartulary, once in the possession of Weever the antiquary, it appears that the bells of the priory of Little Dunmow in Essex were, anno 1501, new cast, and baptized by the following names:

Prima in honore Sancti Michaelis Archangel.

Secunda in honore S. Johannis Evangeliste.

Tertia in honore S. Johannis Baptiste.

Quarta in honore Assumptionis beate Marie.

Quinta in honore sancti Trinitatis, et omnium sanctorum. Ib. 633.

The bells of Osney abbey near Oxford were very famous; their several names were Douce, Clement, Austen, Hautecester [potius Hautcleri], Gabriel, and John.

Nankin, in China was anciently famous for the largeness of its bells; but their enormous weight brought down the tower, the whole building fell to ruin, and the bells have ever lain on the ground. One of these bells is near 12 English feet high, the diameter seven and an half, and its circumference 23; its figure almost cylindric, except for a swelling in the middle; and the thickness of the metal, about the edges, seven inches. From the dimensions of this bell, its weight is computed at 50,000 pounds, which is more than double the weight of that of Erfort, said by father Kircher to be the greatest bell in the world. These bells were cast by the first emperor of the preceding dynasty, about 300 years ago. They have each their name; the hanger (*schoui*), the eater (*che*), the sleeper (*choui*), the will (*si*). Father le Comte adds, that there are seven other bells in Pekin, cast in the reign of Youlo, each of which weighs 120,000 pounds. But the founds even of their biggest bells are very poor; being struck with a wooden in lieu of an iron clapper.

The practice of ringing bells in change, or regular

peals, is said to be peculiar to England; whence Britain has been termed the *ringing island*. The custom seems to have commenced in the time of the Saxons, and was common before the conquest. The ringing of bells, tho' a recreation chiefly of the lower fort, is in itself not incurious. The tolling a bell is nothing more than the producing a sound by a stroke of the clapper against the side of the bell, the bell itself being in a pendant position and at rest. In ringing, the bell, by means of a wheel and a rope, is elevated to a perpendicular; in its motion to this situation the clapper strikes forcibly on one side, and in its return downwards on the other side of the bell, producing at each stroke a sound. There are in London several societies of ringers, particularly one known by the name of the *College-youths*: of this it is said Sir Matthew Hale, lord chief justice of the court of King's Bench, was, in his youthful days, a member; and in the life of this learned and upright judge, written by bishop Burnet, some facts are mentioned which favour this relation. In England the practice of ringing is reduced to a science, and peals have been composed which bear the name of the inventors. Some of the most celebrated peals now known were composed about 50 years ago by one Patrick. This man was a maker of barometers: in his advertisements he styled himself *Torrucellian Operator*, from Torricelli, who invented instruments of this kind. In the year 1684, one Abraham Rudhall, of the city of Gloucester, brought the art of bell-founding to great perfection. His descendants in succession have continued the business of casting bells; and by a list published by them, it appears that at Lady-day, 1774, the family, in peals and odd bells, had cast to the amount of 3594. The peals of St Dunstan's in the east, and St Bride's, London, and St Martin's in the Fields, Westminster, are in the number.

The music of bells is altogether melody; but the pleasure arising from it consists in the variety of interchanges, and the various succession and general predominance of the consonances in the sounds produced. Musical authors seem to have written but little upon this subject.

BELL-Animal. See ANIMALCULE, n° 24—28.

BELL-Metal. See CHEMISTRY, n° 379.

Diving-BELL. See DIVING.

BELL-Foundry. See FOUNDRY.

BELL-Flower, in botany. See CAMPANULA.

BELL-Weed, in botany. See JACCA.

BELLAC, a town of La Marche in France, situated on the little river Union. It contains about 770 houses, and 3000 inhabitants. E. Long. 1. 14. N. Lat. 46. 4.

BELLADONA, in botany, the trivial name of a species of Atropa. See ATROPA.

BELLAI (William du), lord of Langey, a French general, who signalized himself in the service of Francis I. He was also an able negotiator, so that the emperor Charles V. used to say, "that Langey's pen had fought more against him than all the lances in France." He was sent to Piedmont, in quality of viceroy, where he took several towns from the Imperialists. His address in penetrating into the enemy's designs was surprising. In this he spared no expence, and thereby had intelligence of the most secret councils of the emperor and his generals. He was extremely active in influencing

cing some of the universities of France to give their judgment agreeable to the desires of Henry VIII. king of England, when this prince wanted to divorce his queen, in order to marry Anne Bullen. It was then the interest of France to favour the king of England in this particular, it being an affront to the emperor, and a gratification to Henry, which might serve to form a strict alliance between him and Francis I. He was sent several times into Germany to the princes of the Protestant league, and was made a knight of the order of St Michael. He was also a man of learning, having given proofs of his abilities and genius as a writer. He composed several works; the most remarkable of which was, the History of his Own Times, in Latin; divided into octoades, that is, several parts, each consisting of eight books; most of which, however, have been lost. When Langei was in Piedmont, in 1542, he had some remarkable intelligence which he was desirous himself to communicate to the king, and being very infirm, he ordered a litter for his conveyance; but after having passed the mountain of Tarara, betwixt Lyons and Roan, he found himself so extremely bad at St Saphorin, that he was obliged to stop there, where he died the 9th of January, in the year 1543. He was buried in the church of Mans, and a noble monument was erected to his memory.

BELLARMIN (Robert), an Italian Jesuit, one of the best controversial writers of his time. In 1576, he read lectures at Rome on controversies; which he did with such applause, that Sixtus V. sending a legate into France in 1590, appointed him as a divine, in case any dispute in religion should happen to be discussed. He returned to Rome, and was raised successively to different offices, till at last, in 1599, he was honoured with a cardinal's hat; to accept of which dignity, it is said, they were obliged to force him by the threats of an anathema. It is certain, that no Jesuit ever did greater honour to his order than he; and that no author ever defended the cause of the Romish church in general, and that of the pope in particular, to more advantage. The Protestants have owned this sufficiently: for, during the space of 50 years, there was scarcely any considerable divine among them who did not fix upon this author for the subject of his books of controversy. Notwithstanding the zeal with which this Jesuit maintained the power of the pope over the temporality of kings, he displeased Sixtus V. in his work *De Romano Pontifice*, by not insinuating that the power which Jesus Christ gave to his viceregent, was direct, but only indirect; and had the mortification to see it put into the index of the inquisition, though it was afterwards removed. He left, at his death, to the Virgin Mary one half of his soul, and to Jesus Christ the other.—Bellarmine is said to have been a man of great chastity and temperance, and remarkable for his patience. His stature was low, and his mien very indifferent; but the excellence of his genius might be discovered from the traces of his countenance. He expressed himself with great perspicuity; and the words which he first made use of to explain his thoughts were generally so proper, that there appeared no rature in his writings.

BELLATRIX, in astronomy, a ruddy glittering star of the second magnitude, in the left shoulder of Orion. It takes its name from *bellum*, as being anciently

supposed to have a great influence in kindling wars, and forming warriors. Its longitude, according to Hevelius, for the year 1700, was 16° 47' 20"; and its latitude southward 16° 52' 11".

BELLCLORE, a town of Ireland, in the province of Connaught, and county of Sligo. W. Long. 9. 5. N. Lat. 53. 56.

BELLE, a town of the French Netherlands, seated in E. Long. 2. 40. N. Lat. 50. 45.

BELLE (Stephen de la), a celebrated engraver, born at Florence, who improved himself by imitating the designs of Callot. He was greatly honoured by the grand duke; and died in 1664.

BELLEAU (Remi), a French poet, born at Nogent le Rotrou, in the territory of Perche, and province of Orleanois. He lived in the family of Renatus of Lorrain, marquis of Elbeuf, general of the French galleys; and attended him in his expedition into Italy, in 1557. This prince highly esteemed Belleau for his courage; and having also a high opinion of his genius and abilities, entrusted him with the education of his son Charles of Lorrain. Belleau was one of the seven poets of his time who were denominated the *French Pleiades*. He wrote several pieces; and translated the odes of Anacreon into the French language, but in this he is thought not to have preserved all the natural beauties of the original. His pastoral pieces are in greatest esteem. His verses in that way (according to his eulogists) are expressed with such beauty and simplicity, that they seem to be a living picture of what they describe. He also wrote an excellent poem on the nature and difference of precious stones, which by some has been reputed his best performance. Belleau died at Paris, in the family of the duke d'Elbeuf, on the 6th of March, 1577. He was interred in the church De Peres Augullines, near the Pont-neuf: several eulogiums were made to his memory.

BELLEFOREST (Francis de), a French author, born in the province of Guienne, in 1530. He was but seven years of age when he lost his father; and his mother was left in poor circumstances, but she contributed all in her power to his education. He was supported some years by the queen of Navarre, sister to Francis I. Some time after, he went to study at Bourdeaux; thence he removed to Toulouse; and at last to Paris, where he got acquainted with several men of learning, and was honoured with the friendship of many persons of quality. He wrote, 1. A History of the nine Charles's of France; 2. Annotations on the books of St Augustin; 3. An universal history of the world; 4. The chronicles of Nicholas Gillet, augmented; 5. An universal cosmography; 6. Annals, or a general history of France; and many other works. In short, he supported his family by writing books on whatever subject was proposed to him by the bookfellers, according to the taste of the public. He died in 1583.

BELLEGARDE, a strong town of France in Roussillon, on the frontiers of Catalonia. It is an important place on account of its being a passage to the Pyrenean mountains. E. Long. 3. 0. N. Lat. 42. 20.

BELLEGARDE, a town of Burgundy in France, with the title of a duchy. It is seated on the river Saone, in E. Long. 4. 0. N. Lat. 46. 57.

BELLEISLE, an island of France, on the coast of Brittany. It is the largest of all the European islands

Belleisle.

belonging to the French king, being between 12 and 13 leagues in circumference. It is a mixture of craggy rocks and fertile soil; but the inhabitants are very poor, and the only trade carried on in it is the curing of pilchards. There are three harbours in the island, viz. Palais, Sauzon, and Goulford; every one of which harbours under some capital defect, either in being exposed, shallow, or dangerous in the entrance. It contains only one little city called *Le Palais*, three county towns, 103 villages, and about 5000 inhabitants. The island originally belonged to the earl of Cornouaille; but was afterwards yielded to the king, who in 1742 erected it into a duchy, in favours of marshal Belleisle. The town of Palais takes its name from a castle belonging to the duke de Belleisle, which stood in its neighbourhood; but was afterwards converted into a citadel fronting the sea, and strongly fortified. Its fortifications are composed principally of hornworks; and it is provided with two dry ditches, the one next the counterescarp, and the other so contrived as to secure the interior fortifications. This citadel is divided from the largest part of the town by an inlet of the sea, over which there is a bridge of communication. From the other part of the town, and which is most inhabited, it is only divided by its own fortifications and a glacis. In this state was the island in 1761, when an expedition was undertaken against it by a British fleet under the command of commodore Keppel, having on board a considerable land force commanded by general Hodgson. The fleet sailed from Spithead on the 29th of March, and arrived before Belleisle on the 7th of April. The next day it was agreed to attempt a landing on the south-east part of the island, in a sandy bay, near Lochmana point. Here the enemy were in possession of a little fort; they had moreover entrenched themselves on a hill excessively steep, the foot of which was scarped away. The attempt was made in three places with great resolution; but the British were at last repulsed with the loss of 500 men. It was not before the 25th of April that the weather allowed a second attempt. This was made on a very strong place, where the enemy were rather less attentive, on account of the excessive steepness and difficulty of climbing up the rocks. Besides the principal attack, two feints were made at the same time to distract the enemy, whilst the men of war directed their fire with great success on the hills. These manoeuvres gave brigadier-general Lambert, with a handful of men, an opportunity of climbing up a very steep rock without molestation. This little body formed themselves in good order without delay, and were immediately attacked by 300 French. The British, however, sustained this attack until the whole corps of brigadier Lambert, which had now likewise ascended, came to their assistance, with whose help they repulsed the enemy. The landing of all the forces being soon after made good, the French were driven into the town of Palais. Here the chevalier de St Croix who commanded them, a brave and experienced officer, resolved to hold out to the last extremity; and it was not till the 7th of June that he capitulated, and the garrison marched out with the honours of war. The island, however, was restored to the French by the treaty concluded in 1763.

BELLEISLE, an island of North America, lying at the mouth of the freight between the country of the

Esquimaux, or New Britain, and the north end of Newfoundland; whence the freight takes also the name of *Belleisle*. W. Long. 58. 5. N. Lat. 51. 50.

BELLEROPHON, in fabulous history, the son of Glaucus king of Epirus, happening accidentally to kill his brother, fled to Prætus king of Argos, who gave him a hospitable reception; but Sthenobea, his queen, falling in love with the beautiful stranger, and finding that nothing could induce him to injure his benefactor, she accused him to her husband of an attempt to violate her honour. Prætus, however, not being willing to act contrary to the laws of hospitality, sent him to Iobates king of Lyfia, and the father of Sthenobea, with letters desiring him to put him to death: whence the proverb *Bellerophonis literas afferet*, equivalent to *Litera Uria*. That prince, at the receipt of these letters, was celebrating a festival of nine days, which prevented Bellerophon's destruction. Iobates, however, sent him in the mean time to subdue the Solymi, the Amazons, and Lyfians, and thought to get rid of him by exposing him to the greatest dangers; but by his prudence and courage he came off victorious. Iobates next employed him to destroy the Chimæra; when Minerva, or, according to others, Neptune, in consideration of his innocence, furnished him with the horse Pegasus, by whose assistance he killed the Chimæra. Iobates, on his return, being convinced of his truth and integrity, and charmed with his heroic virtues, gave him his daughter Philonoe in marriage, and declared him his successor; which when Sthenobea heard, she killed herself. Bellerophon at length growing vain with his prosperity, resolved, by the assistance of Pegasus, to ascend the skies; when Jupiter checked his presumption, by striking him blind in his flight; on which he fell down to the earth, and wandered till his death in contempt and misery: but Pegasus mounting into heaven, Jupiter placed him among the constellations *.

BELLES LETTRES. Whether we consult the voluminous dictionaries of the French language, or those treatises that profess to point out the method of studying and teaching the belles lettres, we find not, in the one or the other, either a clear definition, or a succinct explication of the words *belles lettres*, nor any summary of those sciences which are comprehended under that general and collective denomination. It appears to be a vague term, under which every one may include whatever he thinks proper. Sometimes we are told that by the belles lettres is meant, the knowledge of the arts of poetry and oratory; sometimes, that the true belles lettres are natural philosophy, geometry, and other essential parts of learning; and sometimes, that they comprehend the art of war, by land and sea: in short, they are made to include all that we know, and whatever we please; so that, in treating on the belles lettres, they talk of the use of the sacraments, &c. * Some comprehend under the term, all those instructive and pleasing sciences which occupy the memory and the judgment, and do not make part either of the superior sciences, of the *polite arts* †, or of mechanic professions: hence they make history, chronology, geography, genealogy, blazonry, philology, &c. the belles lettres. In a word, it were an endless task to attempt to enumerate all the parts of literature which different learned men have comprehended under this title. Nor would it be of any use to the reader

Belleisle
phon.
Belles
Lettres

* See
his and
note.

* Rollin
the Bell
Lettres.

† See A
(polite)

for

file for us to pretend to fix the true import of the term. Whatever arts or sciences it may be supposed to include, they are severally explained in the course of this work.

BELLE-VILLE, a town of the Beaujolois in France, seated near the river Saone, in E. Long. 4. 46. N. Lat. 45. 5.

BELLEY, or BELLAY, a town of France, with a bishop's see, and capital of Beuje. It is seated near the river Rhone, in E. Long. 5. 50. N. Lat. 45. 43.

BELLIN (Gentil), a Venetian painter, born in the year 1421. He was employed by the republic of Venice, and to him and his brother the Venetians are indebted for the noble works which are to be seen in the council-hall. We are told that Mahomet II. emperor of the Turks, having seen some of his performances, was so struck with them, that he wrote to the republic, intreating them to send him. The painter accordingly went to Constantinople, where he did many excellent pieces. Amongst the rest, he painted the decollation of St John the Baptist, whom the Turks revere as a great prophet. Mahomet admired the proportion and shadowing of the work; but he remarked one defect in regard to the skin of the neck, from which the head was separated; and in order to prove the truth of his observation, he sent for a slave and ordered his head to be struck off. This sight so shocked the painter, that he could not be easy till he had obtained his dismissal; which the Grand Signior granted, and made him a present of a gold chain. The republic settled a pension upon him at his return, and made him a knight of St Mark. He died in 1501, in the 80th year of his age.

John Bellino, his brother, painted with more art and sweetness than he; and died in 1512, aged 90.

BELLINGHAM, a town of Northumberland in England. W. Long. 2. 10. N. Lat. 55. 10.

BELLINI (Laurence), an eminent physician, born at Florence in the year 1643. After having finished his studies in polite literature, he went to Pisa, where he was assisted by the generosity of the grand duke Ferdinand II. and studied under two of the most learned men of that age, Oliva and Borelli. Oliva instructed him in natural philosophy, and Borelli taught him mathematics. At 20 years of age, he was chosen professor of philosophy at Pisa, but did not continue long in this office; for he had acquired such a reputation for his skill in anatomy, that the grand duke procured him a professorship in that science. This prince was often present at his lectures, and was highly satisfied with his abilities and performances. Bellini, after having held his professorship almost 30 years, accepted of an invitation to Florence, when he was about 50 years of age. Here he practised physic with great success, and was advanced to be first physician to the grand duke Cosmus III. He wrote the following books in Latin, 1. An anatomical discourse on the structure and use of the kidneys. 2. A speech by way of thanks to the serene duke of Tuscany. 3. Some anatomical observations, and a proposition in mechanics. 4. Of the urine and pulse, of blood-letting, fevers, and diseases of the head and breasts. 5. Several tracts concerning urine, the motion of the heart, and bile, &c. He died January 8th, 1703, being 60 years of age. His works were read and explained publicly during his life, by the famous Scotch physician Dr Pitcairn, professor of physic in Leyden.

BELLINZONA, a town of Italy, in the Milanese; and one of the bailiwicks which the Swis possess in that country. It is seated on the river Jesino, five miles above the place where it falls into the Lago Maggiore, and it is fortified with two strong castles formerly joined together by a wall flanked with towers; but the Swis have demolished a part of the fortifications. E. Long. 9. 0. N. Lat. 46. 8.

BELLIS, the DAISY; a genus of the syngenesia order, belonging to the polygamia superflua class of plants.

Species, &c. 1. The perennis, with a naked stalk, having one flower. This is the common daisy, which grows naturally in pasture-lands in most parts of Europe. It is often a troublesome weed in the grafts of gardens, so is never cultivated. Its leaves have a subtile subacid taste; and are recommended as vulneraries, and in asthma and hectic fevers, as well as in such disorders as are occasioned by drinking cold liquors when the body has been much heated. Ludovici prefers this plant to those commonly used as antiscorbutics and resolvents of coagulated blood in hypochondriacal disorders. 2. The annua, with leaves on the lower part of the stalk, is a low annual plant growing naturally on the Alps and the hilly parts of Italy. It seldom rises more than three inches high; and hath an upright stalk garnished with leaves on the lower part; but the upper part is naked, supporting a single flower like that of the common daisy, but smaller. 3. The hortensis, or garden daisy, with a large double flower. This is generally thought to be only a variety of the common daisy; but Mr Miller assures us, that he was never able to improve the common daisy by culture, or to make the garden daisy degenerate into the common sort for want of it. The varieties of this species cultivated in gardens are, the red and white garden daisy; the double variegated garden daisy; the childing, or hen and chicken garden daisy; and the cock's-comb daisy with red and white flowers. The garden daisies flower in April and May, when they make a pretty variety, being intermixed with plants of the same growth: they should be planted in a shady border, and a loamy soil without dung, in which they may be preserved without varying, provided the roots are parted and transplanted every autumn. This is all the culture they require, except keeping them free from weeds. Formerly they were planted as edgings to borders; but for this purpose they are improper, because where fully exposed to the sun, they frequently die in large patches, whereby the edgings become bald in many places.

BELLIS Major. See CHRYSANTHEMUM.

BELLON, a distemper common in countries where they smelt lead-ore. It is attended with languor, intolerable pains and sensations of gripings in the belly, and generally collicvents.—Beasts, poultry, &c. as well as men, are subject to this disorder: hence a certain space round the smelting houses is called *bellon-ground*, because it is dangerous for an animal to feed upon it.

BELLONA, in Pagan mythology, the goddess of war, is generally reckoned the sister of Mars, and some represent her as both his sister and wife. She is said to have been the inventress of the needle; and from that instrument is supposed to have taken her name *Bellona*, signifying a *needle*. This goddess was of a cruel and savage disposition, delighting in bloodshed and slaughter;

Bellinzona

Bellon

Bellonari
Bellows.

ter; and was not only the attendant of Mars, but took a pleasure in sharing his dangers. She is commonly represented in an attitude expressive of fury and distraction, her hair composed of snakes clotted with gore, and her garments stained with blood: she is generally depicted driving the chariot of Mars, with a bloody whip in her hand; but sometimes she is drawn holding a lighted torch or brand, and at others a trumpet. Bellona had a temple at Rome, near the Circus Flaminius, before which stood the column of war, from whence the consul threw his lance when he declared war. She was also worshipped at Comana, in Cappadocia; and Camden observes, that, in the time of the emperor Severus, there was a temple of Bellona in the city of York.

BELLONARII, in antiquity, priests of Bellona, the goddess of wars and battles. The bellonarii cut and mangled their bodies with knives and daggers in a cruel manner, to pacify the deity. In this they are singular, that they offered their own blood, not that of other creatures, in sacrifice. In the fury and enthusiasm wherewith they were seized on these occasions, they ran about raging, uttering prophecies, and foretelling blood and slaughter, devastations of cities, revolutions of states, and the like: whence Martial calls them *turba entheata Bellone*.-- In after-times, they seem to have abated much of their zeal and transport, and to have turned the whole into a kind of farce, contenting themselves with making signs and appearances of cutting and wounds. Lampridius tells us, the emperor Commodus, out of a spirit of cruelty, turned the farce again into a tragedy, obliging them to cut and mangle their bodies really.

BELLONIA, (so named from the famous Petrus Bellonius, who left many valuable tracts on natural history, &c.) a genus of the monogynia order, belonging to the pentandria class of plants. Of this genus there is only one species known, viz. the aspera, with a rough balm leaf. This is very common in the warm islands of America. It hath a woody stem which rises 10 or 12 feet high, sending out many lateral branches garnished with rough oval leaves placed opposite: the flowers come out from the wings of the leaves in loose panicles, and are succeeded by oval capsules ending in a point, and filled with small round seeds. This plant is propagated by seeds, which must be procured from the places where it grows naturally, and are to be sown in pots plunged into a hot-bed of tanners bark. The plants, when half an inch high, must be transplanted each into a separate pot, and again plunged into the hot-bed, and managed like other tender exotics. These plants may also be propagated by cuttings planted in light earth on a moderate hot-bed, and carefully watered till they have taken root.

BELLORI (John Peter), of Rome; a celebrated antiquary, and connoisseur in the polite arts: Author of the lives of the modern painters, architects, and sculptors, and of other works on antiquities and medals. Died in 1696.

BELLOVACI, (anc. geog.), a people of Gallia Belgica, reckoned the bravest of the Belgæ; now the *Beauvaisis*, in the Isle of France.

BELLOWS, a machine so contrived as to expire and inspire the air by turns, by enlarging and contracting its capacity. This machine is used in chambers and kitchens, in forges, furnaces, and founderies,

to blow up the fire: it serves also for organs and other pneumatic instruments, to give them a proper degree of air. All these are of various constructions, according to their different purposes; but in general they are composed of two flat boards, sometimes of an oval, sometimes of a triangular figure: Two or more hoops, bent according to the figure of the boards, are placed between them: a piece of leather, broad in the middle, and narrow at both ends, is nailed on the edges of the boards, which it thus unites together; as also on the hoops which separate the boards, that the leather may be easier open and fold again: a tube of iron, brass, or copper, is fastened to the undermost board, and there is a valve within, that covers the holes in the underboard to keep in the air.

Anacharsis the Scythian is recorded as the inventor of bellows. The action of bellows bears a near affinity to that of the lungs; and what we call blowing in the latter, affords a good illustration of what is called *respiration* in the former. Animal life itself may, on some occasions, be subsisted by blowing into the lungs with a pair of bellows. Dr Hooke's experiment to this effect is famous: having laid the thorax of a dog bare, by cutting away the ribs and diaphragm, pericardium, &c. and having cut off the aspera arteria below the epiglottis, and bound it on the nose of a bellows, he found, that as he blowed, the dog recovered, and as he ceased, fell convulsive; and thus was the animal kept alternately alive and dead above the space of an hour. There are bellows made wholly of wood, without any leather about them; one of which is preserved in the repository of the Royal Society; and Dr Plot describes another in the copper-works at Ellaston in Staffordshire. Ant. della Fruta contrived a substitute for bellows, to spare the expence thereof in the fusion of metals. This is called by Kircher *camera æolia*, and in England commonly the *water-bellows*; where water falling thro' a funnel into a close vessel, sends from it so much air continually as blows the fire. See the article FURNACE, where different blowing machines of this kind are described.

Smiths and founders bellows, whether single or double, are wrought by means of a rocker, with a string or chain fastened thereto, which the workman pulls. The bellows pipe is fitted into that of the twel. One of the boards is fixed, so as not to play at all. By drawing down the handle of the rocker, the moveable board rises, and, by means of a weight on the top of the upper board, sinks again. The bellows of forges and furnaces of mines usually receive their motion from the wheels of a water-mill. Others, as the bellows of enamellers, are wrought by means of one or more steps or treddles under the workman's feet. Lastly, the bellows of organs are wrought by a man called the *blower*; and in small organs by the foot of the player. Butchers have also a kind of blast or bellows of a peculiar make, by which they bloat or blow up their meat when killed, in order to piecing or parting it the better.

Bone-BELLOWS, *συνθλαπτικὸν ὄργανον*, occur in Herodotus for those applied by the Scythians to the genitals of mares, in order to distend the uterus, and by this compulsion make them yield a greater quantity of milk.

Hessian BELLOWS are a contrivance for driving air into a mine for the respiration of the miners. This M.

Papin

Papin improved, changing its cylindrical form into a spiral one; and with this, working it only with his foot, he could make a wind to raise two pound weight.

Hydrostatic BELLOWS. See *HYDROSTATICS*, n° 4.

BELLUNESE, a territory of Italy, belonging to the Venetians. It lies between Friuli, Codorino, Feltrino, the bishopric of Trent and Tirol. It has good iron mines, but the only considerable place is Belluno.

BELLUNO, a town of Italy, in the Venetian territories, and capital of the Bellunese. It is a bishop's see; and is situated among the Alps, on the river Piave, between the towns Cadora and Trevisini, in E. Long. 12. 15. N. Lat. 46. 9.

BELLY, in anatomy, the same with what is more usually called *abdomen*. See *ANATOMY*, Part IV.

BELMONTE, a town of Italy, in the higher Calabria, and kingdom of Naples. It is seated on the coast of the Tulcan sea, in E. Long. 16. 50. N. Lat. 39. 20.

BELOMANCY, **BELOMANTIA**, a kind of divination by means of arrows, practised in the east, but chiefly among the Arabians *. The word is of Greek origin; compounded of βέλος *arrow*, and μαντία *divination*.

Belomancy has been performed in different manners. One was to mark a parcel of arrows, and put 11 or more of them into a bag: these were afterwards drawn out; and according as they were marked, or not, they judged of future events.

Another way was to have three arrows, upon one of which was wrote, " God orders it me;" upon another, " God forbids it me;" and upon the third nothing at all. These were put into a quiver, out of which they drew one of the three at random: if it happened to be that with the first inscription, the thing they consulted about was to be done; if it chanced to be that with the second inscription, it was left alone; but if it proved that without inscription, they drew over again.

Belomancy is an ancient practice, and probably that which Ezekiel mentions, *chap. xxi. 21*. At least St Jerome understands it so, and observes that the practice was frequent among the Assyrians and Babylonians. Something like it is also mentioned in Hosea, *chap. iv*. only that staves are there mentioned instead of arrows, which is rather rhabdomancy than belomancy. Grotius, as well as Jerome, confounds the two together, and shews that it prevailed much among the Magi, Chaldeans, and Scythians; whence it passed to the Slavonians, and thence to the Germans, whom Tacitus observes to make use of it. See *RHABDOMANCY*.

BELON (Peter), of Le Mans, the capital of le Maine a province of France, flourished about the middle of the 16th century. He published several books in Latin. He wrote, in French, of birds, beasts, fishes, serpents, and the neglected culture of plants; and a book of Travels, or observations of many singularities and memorable things found in Greece, Asia, Judæa, Egypt, Arabia, and other foreign countries. He was murdered near Paris by one of his enemies, in 1564.

BELONE, in ichthyology, the trivial name of a species of efox. See *ESOX*.

BELT, the Great, a famous strait of Denmark between the island of Zealand and that of Tünen, at the

entrance of the Baltic sea. It is not however so commodious, nor so much frequented, as the sound. In 1658 the whole strait was frozen so hard, that Charles Gustavus king of Sweden marched over it with a design to take Copenhagen.

BELT, the Lesser, lies to the west of the great belt, between the island of Funen and the coast of Jutland. It is one of the passages from the German ocean to the Baltic, though not three miles in breadth, and very crooked.

BELT, in the military art, a leathern girdle for sustaining the arms, &c. of a soldier.

BELTS, in astronomy, two zones, or girdles, surrounding the body of the planet of Jupiter *.

BELTS, in geography, certain straits between the German ocean and the Baltic. The belts belong to the king of Denmark, who exacts a toll from all ships which pass through them, excepting those of Sweden, which are exempted.

BEL-TEIN, a superstitious custom observed in the Highlands of Scotland. It is a kind of rural sacrifice, performed by the herdsmen of every village, on the 1st of May. They cut a square trench on the ground, leaving a turf in the middle: on that they make a fire of wood, on which they dress a large caudle of eggs, butter, oatmeal, and milk; and bring, besides the ingredients of the caudle, plenty of beer and whisky; for each of the company must contribute something. The rites begin with spilling some of the caudle on the ground, by way of libation: on that, every one takes a cake of oatmeal, upon which are raised nine square knobs, each dedicated to some particular being, the supposed preserver of their flocks and herds, or to some particular animal, the real destroyer of them: each person then turns his face to the fire, breaks off a knob, and flinging it over his shoulder, says, *This I give to thee, preserve thou my horses; this to thee, preserve thou my sheep; and so on*. After that, they use the same ceremony to the noxious animals: *This I give to thee, O fox! spare thou my lambs; this to thee, O hooded crow! this to thee, O eagle!* When the ceremony is over, they dine on the caudle; and after the feast is finished, what is left is hid by two persons deputed for that purpose; but on the next Sunday they re-assemble and finish the reliques of the first entertainment.

BELTURBET, a town of Ireland in the county of Cavan, and province of Ulster, situated on the river Earn, in W. Long. 7. 35. N. Lat. 54. 7.

BELTZ, or **Belzo**, a province of Red Russia in Poland, bounded by Leopold on the south, by Chelm on the north, Little Poland on the east, and Volhynia on the west. Its capital town is Beltz.

BELTZ, or **Belzo**, a town of Poland, and capital of the province of the same name, seated on the confines of Upper Volhynia, among marshes, in E. Long. 25. 15. N. Lat. 50. 5.

BELVEDERE, in the Italian architecture, &c. denotes either a pavilion on the top of a building, or an artificial eminence in a garden; the word literally signifying a *fine prospect*.

BELVEDERE, a considerable town of Greece, and capital of a province of the same name in the Morea. The province lies on the western coast: it is the most fertile and rich in all the Morea; and from it the railins called *Belvedere* take their name. The town is situated

Belt
||
Belvedere.

* See *Astronomy*, n° 23.
45.

Pennant's Tour.

Jelamian

Ben.

See Bel-

in E. Long. 22. o. N. Lat. 38. 5.

BELUNUM, (anc. geogr.), a town of Rhetia, above Feltria, in the territory of the Veneti; now *Beluno*, capital of the Bellunese in the territory of Venice*.

BELUS, (anc. geogr.), a small river of Galilee, at the distance of two Itadia from Ptolemais, running from the foot of mount Carmel out of the lake Cendevia. Near this place, according to Josephus, was a round hollow or valley, where was a kind of sand fit for making glass; which, though exported in great quantities, was found to be inexhaustible. Strabo says, the whole of the coast from Tyre to Ptolemais has a sand fit for making glass; but that the sand of the rivulet Belus and its neighbourhood is a better sort; and here, according to Pliny, the making of glass was first discovered.

BEMA, in antiquity, denotes a step or pace. The bema made a kind of itinerary measure among the Greeks, the length of which was equivalent to one cubit and two thirds, or to ten palms. Whence also the term *bematization*, *βηματισμός*, to measure a road.

BEMA, in ecclesiastical writers, denotes the altar or sanctuary in the ancient churches. In which sense *bema* made the third or innermost part of the church, answering to the chancel among us.

BEMA was also used for the bishop's chair, seat, or throne, placed in the sanctuary. It was called *bema* from the steps by which it was to be ascended.

BEMA was also used for the reader's desk. This in the Greek church was denominated *βημα γλωσσίου*, in the Latin church *ambo*.

BEMBEA, a province of the kingdom of Angola in Africa. It is divided into Higher and Lower; and extends on one side along the sea, and on the other divides Angola from the foreign states on the south. The country is large, populous, and abounding with cattle; with the fat of which the inhabitants anoint their heads and bodies, and clothe themselves with their hides coarsely dressed. They are addicted to the same idolatrous superstitions with the rest of the natives, but speak a quite different language. The province is watered by a river called *Lutano*, or *San Francisco*, which abounds with crocodiles, sea-horses, and monstrous serpents, that do a great deal of mischief.

BEMBO (Peter), a noble Venetian, secretary to Leo X. and afterwards cardinal, was one of the best writers of the 16th century. He was a good poet, both in Italian and Latin; but he is justly censured for the looseness and immodesty of some of his poems. He published, besides these, A History of Venice; Letters; and a book in praise of the duke and dutches of Urbino. He died in 1547, in the 72^d year of his age.

BEMSTER, or **BEMISTER**, a town of Dorsetshire in England, seated on the river Bert, in W. Long. 3. 15. N. Lat. 50. 45.

BEN. See **BENH**.

BEN, in pharmacy, the name of an exotic purgative fruit, of the size and figure of a nut; whence it is also called the *ben-nut*, sometimes *balanus myrsinica*, or *glans unguentaria*.

Naturalists distinguish two kinds of bens; viz. the great, *ben magnum*, which resembles the filbert, and is by some called *avellana purgatrix*, brought from America; and the small, *ben parvum*, brought from Ethiopia.

Ben-nuts yield, by expression, much oil, which, from its property of not becoming rancid, at least for years, is used as a menstruum for the extraction of the odoriferous part of flowers of jelsamian, violets, roses, hyacinths, lillies of the valley, tuberoses, jonquils, clove-july flowers, and others, which, like these, yield little or no essential oil by distillation, but impart their fragrance to expressed oils. The method of impregnating oil of ben with the odour of flowers is this: Some fine carded cotton is dipt in the oil, and put in the bottom of a proper vessel. On this is spread a thick layer of fresh flowers, above which more cotton dipt in oil is placed; and thus alternately flowers and cotton are disposed, till the vessel (which may be made of tin, with a cover to be screwed on to it, or of porcelain) is full. By digestion during 24 hours in a water-bath, the oil will receive the odour of flowers.

BENAVARRI, a town of the kingdom of Arragon in Spain, seated on the frontiers of Catalonia. E. Long. o. 40. N. Lat. 41. 55.

BENAVENTO, a town of Spain, in the kingdom of Leon, and Terra di Campos, with the title of a duchy. It is seated on the river Ela, in W. Long. 5. o. N. Lat. 42. 4.

BENAVIDUS, or **BONAVITUS** (Marcus Mantua), a celebrated civilian, taught civil law with reputation, during 60 years, at Padua the place of his birth; and died in 1582, aged 93. His principal works are, 1. *Collectanea super Jus Casareum*. 2. *Consiliorum*, tom. ii. 3. *Problematum legalium*. 4. *De illusisribus Jurisconsultis*, &c.

BENCH, or **BANC**, in law. See **BANC**.

Free BENCH signifies that estate in copyhold-lands which the wife, being espoused a virgin, has, after the decease of her husband, for her dower, according to the custom of the manor. As to this free-bench, several manors have several customs; and in the manors of East and West Enbourne, in the county of Berks, and other parts of England, there is a custom, that when a copyhold tenant dies, the widow shall have her free-bench in all the deceased husband's lands, whilst she lives single and chaste; but if she commits incontinency, she shall forfeit her estate: nevertheless, upon her coming into the court of the manor, riding on a black ram, and having his tail in her hand, and at the same time repeating a form of words prescribed, the steward is obliged, by the custom of the manor, to re-admit her to her free-bench.

King's-BENCH, a court in which the king was formerly accustomed to sit in person, and on that account was moved with the king's household. This was originally the only court in Westminster-hall, and from this it is thought that the courts of common pleas and exchequer were derived. As the king in person is still presumed in law to sit in this court, though only represented by his judges, it is said to have supreme authority; and the proceedings in it are supposed to be *coram nobis*, that is, before the king. This court consists of a lord chief justice and three other justices or judges, who are invested with a sovereign jurisdiction over all matters whether of a criminal or public nature. All crimes against the public good, though they do not injure any particular person, are under the cognizance of this court; and no private subject can suffer any unlawful violence or injury against his person, liberty,

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erty, or possessions, but a proper remedy is afforded him here; not only for satisfaction of damages sustained, but for the punishment of the offender; and wherever this court meets with an offence contrary to the first principles of justice, it may punish it. It frequently proceeds on indictments found before other courts, and removed by *certiorari* into this. Persons illegally committed to prison, though by the king and counsel, or either of the houses of parliament, may be bailed in it; and in some cases, even upon legal commitments. Writs of mandamus are issued by this court, for the restoring of officers in corporations, &c. unjustly turned out, and freemen wrongfully disfranchised.

The court of king's bench is now divided into a crown-side and plea-side; the one determining criminal, and the other civil causes. In the first it determines criminal matters of all kinds, where the king is plaintiff; such as treasons, felonies, murders, rapes, robberies, riots, breaches of the peace, and all other causes that are prosecuted by indictment, information, &c. On the plea-side, it determines all personal actions commenced by bill or writ; as actions of debt, upon the case, detinue, trover, ejectment, trespass, waste, &c. against any person in the custody of the marshal of the court, as every person sued here is supposed to be by law.

The officers of this court on the crown side are the clerk and secondary of the crown; and on the side of the pleas there are two chief clerks or prothonotaries, and their secondary and deputy, the custos brevium, two clerks of the papers, the clerk of the declarations, the signer and sealer of bills, the clerk of the rules, clerk of the errors, and clerk of the bails; to which may be added the filazers, the marshal of the court, and the crier.

Amicable BENCH. See *AMICABLE*.

BENCHERS, in the inns of court, the senior members of the society, who are invested with the government thereof.

BENCOOLEN, a fort and town of Asia, on the south-west coast of the island of Sumatra, belonging to the British. The place is known at sea by a slender mountain called the *Sugar Loaf*, which rises about 20 miles inland. About a quarter of a mile from the sea stands an Indian village, whose houses are small and low, and built on poles. The country about Bencoolen is mountainous and woody, and the air unwholesome, the mountains being continually covered with thick heavy clouds that produce lightning, thunder, and rain. There is no beef to be had, except that of buffaloes, which is not very palatable; and indeed provisions of all kinds, except fruit, are pretty scarce. The chief trade is in pepper, of which great quantities grow on the island. There are frequent bickerings betwixt the natives and the factory, to the no small injury of the East India company. The factory was once entirely deserted; and had not the natives found that trade decreased by reason of their absence, it is scarce probable that ever the English would have been invited there again. E. Long. 101. 5. S. Lat. 4. 5.

BEND, in heraldry, one of the nine honourable ordinaries, containing a third part of the field when charged, and a fifth when plain. It is sometimes, like other ordinaries, indented, ingrailed, &c. and is either dexter or sinister. See *HERALDRY*, n° 19, 20.

In BEND, is when any things, borne in arms, are placed obliquely from the upper corner to the opposite lower, as the bend lies.

BENDER, a town of Bessarabia in European Turkey, seated on the river Niefter, in E. Long. 29. 5. N. Lat. 46. 40. It is remarkable for being the place of retreat of Charles XII. after he was defeated by the Russians at the battle of Pultowa in 1709.

BENDERMASSEN, a town of the island of Borneo in Asia, and capital of a kingdom of the same name. It has a good harbour; and stands in E. Long. 113. 50. S. Lat. 2. 40.

BENDIDIA, in antiquity, a festival, not unlike the Bacchanalia, celebrated by the Athenians in honour of Diana.

BENDING, in a general sense, the reducing a straight body into a curve, or giving it a crooked form.

The bending of timber-boards, &c. is effected by means of heat, whereby their fibres are so relaxed that you may bend them into any figure.

BENDING, in the sea-language, the tying two ropes or cables together: thus they lay, *bend the cable*, that is, make it fast to the ring of the anchor; *bend the sail*, make it fast to the yard.

BENDS, in a ship, the same with what is called *swails*, or *swales*; the outmost timbers of a ship's side, on which men set their feet in climbing up. They are reckoned from the water, and are called the *first*, *second*, or *third bend*. They are the chief strength of a ship's sides; and have the beams, knees, and foot-hooks, bolted to them.

BENDY, in heraldry, is the field divided into four, six, or more parts, diagonally, and varying in metal and colour.—The general custom of England is to make an even number; but in other countries they regard it not, whether even or odd.

BENCAPED, among sailors. A ship is said to be *bencaped* when the water does not flow high enough to bring her off the ground, out of the dock, or over the bar.

BENEDETTO (St), a considerable town of the Mantuan, in Italy, in E. Long. 11. 25. N. Lat. 45. 0.

BENEDICITE, among ecclesiastical writers, an appellation given to the song of the three children in the fiery furnace, on account of its beginning with the word *benedicite*.—The use of this song in Christian worship is very ancient, it appearing to have been sung in all the churches as early as St Chrysostom's time.

BENEDICT XIV. pope, (Prosper Lambertini of Bologna), celebrated for his learning and moderation, which gained him the esteem of all sensible Protestants. He was the patron of learned men and celebrated artists; and an elaborate writer, on theological subjects. His works make 12 vols in folio. He died in 1758.

BENEDICT (St), the founder of the order of the Benedictin monks, was born in Italy, about the year 480. He was sent to Rome when he was very young, and there received the first part of his education. At 14 years of age he was removed from thence to Sublaco, about 40 miles distant. Here he lived a most ascetic life, and shut himself up in a cavern, where nobody knew any thing of him except St Romanus, who, we are told, used to defend to him by a rope, and to supply him with provisions. But being afterwards discovered by the monks of a neighbouring monastery,

Bend
Benedict.

Benedict,
Benedictins.

they chose him for their abbot. Their manners, however, not agreeing with those of Benedict, he returned to his solitude; whither many persons followed him, and put themselves under his direction, so that in a short time he built 12 monasteries. In the year 528, or the following, he retired to mount Cassino, where idolatry was still prevalent, there being a temple of Apollo erected here. He instructed the people in the adjacent country, and having converted them, he broke the image of Apollo, and built two chapels on the mountain. Here he founded also a monastery, and instituted the order of his name, which in time became so famous and extended over all Europe. It was here too that he composed his *Regula Monachorum*, which Gregory the Great speaks of as the most sensible and best written piece of that kind ever published. The time of his death is uncertain, but is placed between 540 and 550. He was looked upon as the Elisha of his times; and is reported to have wrought a great number of miracles, which are recorded in the second book of the dialogues of St Gregory the Great.

BENEDICT, abbot of Peterborough, was educated at Oxford, became a monk in the monastery of Christ's church in Canterbury, and some time after was chosen prior by the members of that society. Though he had been a great admirer of Archbishop Becket, and wrote a life of that prelate, he was so much esteemed by Henry II. that by the influence of that prince he was elected abbot of Peterborough, A. D. 1177. He assisted at the coronation of Richard I. A. D. 1189; and was advanced to be keeper of the great seal, A. D. 1191. But he did not long enjoy this high dignity, as he died on Michaelmas day, A. D. 1193. Besides his Life of Archbishop Becket, he composed a History of Henry II. and Richard I. from A. D. 1170 to A. D. 1192; which hath been much and justly esteemed by many of our greatest antiquaries, as containing one of the best accounts of the transactions of those times. A beautiful edition of this work was published at Oxford, in two volumes, by Mr Hearne, A. D. 1735.

BENEDICTINS, in church-history, an order of monks, who profess to follow the rules of St Benedict.

The Benedictins, being those only that are properly called *monks*, wear a loose black gown, with large wide sleeves, and a capuche, or cowl, on their heads, ending in a point behind. In the canon law, they are styled *black friars*, from the colour of their habit.

The rules of St Benedict, as observed by the English monks before the dissolution of the monasteries, were as follows: They were obliged to perform their devotions seven times in 24 hours, the whole circle of which devotions had a respect to the passion and death of Christ: they were obliged always to go two and two together: every day in lent they were obliged to fast till six in the evening, and abated of their usual time of sleeping and eating; but they were not allowed to practise any voluntary austerities without leave of their superior: they never conversed in their refectory at meals, but were obliged to attend to the reading of the scriptures: they all slept in the same dormitory, but not two in a bed; they lay in their clothes: for small faults they were shut out from meals; for greater, they were debarred religious commerce, and excluded from the chapel; and as to incorrigible offenders, they were excluded from the monasteries. Every monk had two

coats, two cowls, a table-book, a knife, a needle, and a handkerchief; and the furniture of their bed was a mat, a blanket, a rug, and a pillow.

The time when this order came into England is well known; for to it the English owe their conversion from idolatry. In the year 596, Pope Gregory sent hither Augustine, prior of the monastery of St Andrew at Rome, with several other Benedictin monks. St Augustine became archbishop of Canterbury; and the Benedictins founded several monasteries in England, as also the metropolitan church of Canterbury, and all the cathedrals that were afterwards erected.

Pope John XXII. who died in 1334, after an exact inquiry, found, that, since the first rise of the order, there had been of it 24 popes, near 200 cardinals, 7000 archbishops, 15,000 bishops, 15,000 abbots of renown, above 4000 saints, and upwards of 37,000 monasteries. There have been likewise of this order 20 emperors and 10 empresses, 47 kings and above 50 queens, 20 sons of emperors and 48 sons of kings; about 100 princesses, daughters of kings and emperors; besides dukes, marquesses, earls, countesses, &c. innumerable. The order has produced a vast number of eminent writers and other learned men. Their Rabanus set up the school of Germany. Their Alcuinus founded the university of Paris. Their Dionysius Exiguus perfected the ecclesiastical computation. Their Guido invented the scale of music; and their Sylvestre, the organ. They boast to have produced Anselmus, Ildephonsus, Venerable Bede, &c.

There are nuns likewise who follow the rule of St Benedict; among whom those, who call themselves *mitigated*, eat flesh three times a-week, on Sundays, Tuesdays, and Thursdays: the others observe the rule of St Benedict in its rigour, and eat no flesh unless they are sick.

BENEDICTION, in a general sense, the act of blessing, or giving praise to God, or returning thanks for his favours. Hence also benediction is still applied to the act of saying grace before or after meals. Neither the ancient Jews, nor Christians, ever eat without a short prayer. The Jews are obliged to rehearse 100 benedictions *per day*; of which, 80 are to be spoken in the morning. The first treatise of the first order in the Talmud, entitled *Seraim*, contains the form and order of the daily benedictions. It was usual to give benediction to travellers on their taking leave; a practice which is still preserved among the monks. Benedictions were likewise given among the ancient Jews, as well as Christians, by imposition of hands. And when at length the primitive simplicity of the Christian worship began to give way to ceremony, they added the sign of the cross, which was made with the same hand, as before, only elevated, or extended. Hence benediction, in the modern Romish church, is used, in a more particular manner, to denote the sign of the cross made by a bishop, or prelate, as conferring some grace on the people. The custom of receiving benediction, by bowing the head before the bishops, is very ancient; and was so universal, that emperors themselves did not decline this mark of submission.—Under the name *benediction*, the Hebrews also frequently understand the presents which friends make to one another, in all probability because they are generally attended with blessings and compliments, both from those who give, and those who receive them.

Nuptial

Benedi
Benedi

dition,
benefice.

Nuptial BENEDICTION, the external ceremony performed by the priest in the office of matrimony. This is also called *sacerdotal* and *matrimonial benediction*, by the Greeks *προβαρια* and *προβαρια*. The nuptial benediction is not essential to, but the confirmation of, a marriage in the civil law.

Beatific BENEDICTION, *benedictio beatifica*, is the vaticum given to dying persons. The pope begins all his bulls with this form: *Salutem et apostolicam benedictionem*.

BENEDICTION is also used for an ecclesiastical ceremony, whereby a thing is rendered sacred or venerable. In this sense benediction differs from consecration, as in the latter unction is applied, which is not in the former: Thus the chalice is consecrated, and the pix blessed; as the former, not the latter, is anointed: though, in the common usage, these two words are applied promiscuously.—The spirit of piety, or rather of superstition, has introduced into the Romish church benedictions for almost every thing. We read of forms of benedictions for wax-candles, for boughs, for ashes, for church-vessels, and ornaments; for flags or ensigns, arms, first-fruits, houses, ships, paschal eggs, cilicium or the hair-cloth of penitents, church-yards, &c. In general, these benedictions are performed by aspersions of holy water, signs of the cross, and prayers suitable to the nature of the ceremony. The forms of these benedictions are found in the Roman pontifical, in the Roman missal, in the book of ecclesiastical ceremonies printed in pope Leo X.'s time, and in the rituals and ceremonies of the different churches which are found collected in father Martene's work on the rites and discipline of the church.

BENEFICE (*beneficium*), in middle-age writers, is used for a fee, sometimes denominated more peculiarly *beneficium militare*. In this sense, benefice was an estate in land, at first granted for life only; so called, because it was held *ex mera beneficencia* of the donor; and the tenants were bound to swear fealty to the lord, and to serve him in the wars. In after-times, as these tenures became perpetual and hereditary, they left their name of *beneficia* to the livings of the clergy; and retained to themselves the name of *feudi*.

BENEFICE, in an ecclesiastical sense, a church endowed with a revenue for the performance of divine service; or the revenue itself assigned to an ecclesiastical person, by way of stipend, for the service he is to do that church.

All church-preferments, except bishoprics, are called *benefices*; and all benefices are, by the canonists, sometimes styled *dignities*: but we now ordinarily distinguish between benefice and dignity; applying dignity to bishoprics, deanries, archdeacons, and prebendaries; and benefice to parsonages, vicarages, and donatives.

Benefices are divided by the canonists into simple and sacerdotal. In the first there is no obligation but to read prayers, sing, &c. such are canonries, chaplainships, chantries, &c.: the second are charged with the cure of souls, or the direction and guidance of consciences; such as vicarages, rectories, &c.

The Romanists again distinguish benefices into regular and secular. *Regular* or titular benefices are those held by a religious, or a regular, who has made profession of some religious order; such are abbacies, priories, conventuals, &c.; or rather, a regular benefice is

that which cannot be conferred on any but a religious, either by its foundation, by the institution of some superior, or by prescription: for prescription, forty years possession by a religious makes the benefice regular. *Secular* benefices are only such as are to be given to secular priests, *i. e.* to such as live in the world, and are not engaged in any monastic order. All benefices are reputed secular, till the contrary is made to appear. They are called *secular benefices*, because held by seculars; of which kind are almost all cures.

The canonists distinguish three manners of vacating a benefice, *viz.* 1. *De jure*, when the person enjoying it is guilty of certain crimes expressed in those laws, as heresy, simony, &c. 2. *De facto*, as well as *de jure*, by the natural death or the resignation of the incumbent; which resignation may be either express, or tacit, as when he engages in a state, &c. inconsistent with it, as, among the Romanists, by marrying, entering into a religious order, or the like. 3. By the *sentence of a judge*, by way of punishment for certain crimes, as concubinage, perjury, &c.

BENEFICE in commendam is that, the direction and management of which, upon a vacancy, is given or recommended to an ecclesiastic, for a certain time, till he may be conveniently provided for.

BENEFICIARI, in Roman antiquity, denote soldiers who attended the chief officers of the army, being exempted from other duty. Beneficarii were also soldiers discharged from the military service or duty, and provided with *beneficia* to subsist on. These were probably the same with the former, and both might be comprised in the same definition. They were old experienced soldiers, who, having served out their legal time, or received a discharge as a particular mark of honour, were invited again to the service, where they were held in great esteem, exempted from all military drudgery, and appointed to guard the standard, &c. These, when thus recalled to service, were also denominated *evocati*; before their recall, *emeriti*.

BENEFICIARI was also used for those raised to a higher rank by the favour of the tribunes or other magistrates. The word *beneficiarius* frequently occurs in the Roman inscriptions found in Britain, where *consulis* is always joined with it; but besides *beneficiarius consulis*, we find in Gruter *beneficiarius tribunus, praetorius, legati, praefecti, proconsulis*, &c.

BENEFICIARY, in general, something that relates to benefices.

BENEFICIARY, *beneficiarius*, is more particularly used for a beneficed person, or him who receives and enjoys one or more benefices. A beneficiary is not the proprietor of the revenues of his church; he has only the administration of them, tho' unaccountable for the same to any, but God.

BENEFICIARY is also used, in middle-age writers, for a feudatory or vassal. The denomination was also given to the clerks or officers who kept the accounts of the *beneficia*, and made the writings necessary thereto.

BENEFICIUM, in military matters among the Romans, denoted a promotion to a higher rank by the favour of some person in authority.

BENEFIELD (Sebastian), an eminent divine of the 17th century, was born in 1559, at Prestonbury in Gloucestershire, and educated at Corpus Christi college in Oxford. In 1608, he took the degree of

Benefice
Beneficial.

Benefit
||
Bengal.

Bengal

doctor in divinity; and five years after, was chosen Margaret professor in that university. He had been presented several years before to the rectory of Meyfey-Hampton, in Gloucestershire. He published Commentaries upon the first, second, and third chapters of Amos; a considerable number of sermons; and some Latin treatises. He died in 1630.

BENEFIT OF CLERGY. See **CLERGY.**

BENESOEUF, a town of Egypt, seated on the western shore of the Nile, and remarkable for its hemp and flax. E. Long. 31. o. N. Lat. 29. 10.

BENEVENTE, a town of the province of Leon in Spain, seated on the river Elsa, in W. Long. 5. 5. N. Lat. 42. 4.

BENEVENTO, a city of Italy, in the kingdom of Naples, with an archbishop's see. It is situated near the confluence of the rivers Sabato and Calore, in a fertile valley called the *strait of Benevento*, full of gentlemen's seats and houses of pleasure. This town hath frequently suffered terribly by earthquakes; particularly in 1703, when a great part of it was overturned, and the rest much damaged. E. Long. 14. 57. N. Lat. 41. 6.

BENEVENTUM, (anc. geog.), a town of the Samnites, formerly called *Maleventum* from the unwholesomeness of the wind, and under that appellation it is mentioned by Livy; but after a Roman colony was led thither in the 485th year of the city, it came to have the name of *Beneventum*, as a more auspicious title. It is mentioned by Horace as an ancient city said to have been built by Diomedes before the Trojan war. Now *Benevento*: See that article.

BENEVOLENCE, in morals, signifies the love of mankind in general, accompanied with a desire to promote their happiness. See **MORALS.**

BENFIELD, a town of Alface in France, whose fortifications were demolished in consequence of the treaty of Westphalia. E. Long. 7. 45. N. Lat. 48. 14.

1
Boundaries.

BENGAL, a vast country of Asia, bounded by the kingdom of Alham and Arracan on the east; by several provinces belonging to the Great Mogul on the west; by frightful rocks on the north; and by the sea on the south. It extends on both sides the Ganges, which rises from different sources in Thibet; and, after several windings through Caucasus, penetrates into India, across the mountains on its frontier. This river, after having formed in its course a great number of large, fertile, and well-peopled islands, discharges itself into the sea, by several mouths, of which only two are known and frequented.

Towards the source of this river, was formerly a city called *Pallibothra*. Its antiquity was so great, that Diodorus Siculus makes no scruple of assuring us that it was built by that Hercules to whom the Greeks ascribed all the great and surprising actions which had been performed in the world. In Pliny's time, its opulence was celebrated through the whole universe; and it was looked upon as the general mart for the people inhabiting both sides of the river that washed its walls.

2
L. Jona.

The history of the revolutions that have happened in Bengal, is intermixed with so many fables, that it does not deserve our attention. All we can discover, is, that the extent of this empire has been sometimes greater, and sometimes less; that it has had fortunate and unfortunate periods; and that it has alternate-

ly been formed into one single kingdom, or divided into several independent states. It was under the dominion of one master, when a more powerful tyrant Akbar, grandfather of Aurengzebe, undertook the conquest of it; which was begun in 1590, and completed in 1595. Since this era Bengal has always acknowledged the Mogul for its sovereign. At first, the governor to whom the administration of it was intrusted, held his court at Raja-Mahul, but afterwards removed it to Dacca. Ever since the year 1718, it has been fixed at Muxadavad, a large inland town two leagues distant from Cassimbuzar. There are several Nabobs and Rajahs subordinate to this viceroy, who is called *subah*.

This important post was occupied for a long time by the sons of the Great Mogul; but they so frequently misemployed the forces and treasure at their disposal, to raise disturbances in the empire, that it was thought proper to commit that province to men who had less influence, and were more dependent. True it is, the new governors gave no alarm to the court of Delhi; but they were far from being punctual in remitting the tribute they collected to the royal treasury. These abuses gained further ground after the expedition of Kouli Kan; and matters were carried so far, that the emperor, who was unable to pay the Marattas what he owed them, authorised them, in 1740, to collect it in Bengal themselves. These banditti, to the number of 200,000, divided themselves into three armies, ravaged this fine country for 10 years together, and did not leave it till they had extorted immense sums.

During all these commotions, despotic government, which unhappily prevails all over India, maintained its influence in Bengal; the small district of Bissenpour excepted, which had preserved, and still continues to preserve, its independence. See **BISSENPUR.**

Though the rest of Bengal is far from enjoying the same happiness, it is nevertheless the richest and most populous province in the whole empire. Besides its own consumption, which is necessarily considerable, its exports are immense. One part of its merchandise is carried into the inland country. Thibet takes off a quantity of its cottons, besides some iron and cloths of European manufacture. The inhabitants of those mountains fetch them from Patna themselves, and give musk and rhubarb in exchange.

3
Comm.
inland.

But the trade of Thibet is nothing in comparison of that which Bengal carries on with Agra, Delhi, and the provinces adjacent to those superb capitals, in salt, sugar, opium, silk, silk-stuffs, and an infinite quantity of cottons, and particularly muslins. These articles, taken together, amounted formerly to more than 1,750,000 l. a-year. So considerable a sum was not conveyed to the banks of the Ganges; but it was the means of retaining one nearly equal, which must have issued from thence to pay the duties, or for other purposes. Since the viceroys of the Mogul have made themselves nearly independent, and send him no revenues but such as they chuse to allow him, the luxury of the court is greatly abated, and the trade we have been speaking of is no longer so considerable.

The maritime trade of Bengal, managed by the natives of the country, has not suffered the same diminution, nor was it ever so extensive, as the other. It may be divided into two branches, of which Catek is

4
Maritim

in

al. in possession of the greater part.

Catek is a district of some extent, a little below the most western mouth of the Ganges. Balasore, situated upon a navigable river, serves it for a port. The navigation to the Maldives, which the English and French have been obliged to abandon on account of the climate, is carried on entirely from this road. Here they load their vessels with rice, coarse cottons, and some silk-stuffs, for these islands; and receive cowries in exchange, which are used for money in Bengal, and are sold to the Europeans.

The inhabitants of Catek, and some other people of the Lower Ganges, maintain a considerable correspondence with the country of Aſham. This kingdom, which is thought to have formerly made a part of Bengal, and is only divided from it by a river that falls into the Ganges, deserves to be better known, if what is asserted here be true, that gun-powder has been discovered there, and that it was communicated from Aſham to Pegu, and from Pegu to China. Its gold, silver, iron, and lead mines, would have added to its fame, if they had been properly worked. In the midst of these riches, which were of very little service to this kingdom, salt was an article of which the inhabitants were so much in want, that they were reduced to the expedient of procuring it from a decoction of certain plants.

In the beginning of the present century, some Bramins of Bengal carried their superstitions to Aſham, where the people were so happy as to be guided solely by the dictates of natural religion. The priests persuaded them, that it would be more agreeable to Brahma if they substituted the pure and wholesome salt of the sea to that which they used. The sovereign consented to this, on condition that the exclusive trade should be in his hands; that it should only be brought by the people of Bengal; and that the boats laden with it should stop at the frontiers of his dominions. Thus have all these false religions been introduced by the influence and for the advantage of the priests who teach, and of the kings who admit, them. Since this arrangement has taken place, 40 vessels from 500 to 600 tons burden each are annually sent from the Ganges to Aſham laden with salt, which yields 200 *per cent.* profit. They receive in payment a small quantity of gold and silver, ivory, musk, eagle-wood, gum-lac, and a large quantity of silk.

Excepting these two branches of maritime trade, which, for particular reasons, have been confined to the natives of the country, all the rest of the vessels sent from the Ganges to the different sea-ports of India belong to the Europeans, and are built at Pegu*.

A still more considerable branch of commerce, which the Europeans at Bengal carry on with the rest of India, is that of opium. Patna, situated on the Upper Ganges, is the most celebrated place in the world for the cultivation of opium. The fields are covered with it. Besides what is carried into the inland parts, there are annually 3000 or 4000 chests exported, each weighing 300 pounds. It sells upon the spot at the rate of between 24 and 25 l. a chest on an average. This opium is not purified like that of Syria and Persia, which we make use of in Europe; it is only a paste that has undergone no preparation, and has not a tenth part of the virtue of purified opium.

The Dutch send rice and sugar from their settlements to the coast of Coromandel, for which they are paid in specie, unless they have the good fortune to meet with some foreign merchandise at a cheap rate. They send out one or two vessels laden with rice, cottons, and silk: the rice is sold in Ceylon, the cottons at Malabar, and the silk at Surat; from whence they bring back cotton, which is usefully employed in the coarser manufactures of Bengal. Two or three ships laden with rice, gum-lac, and cotton stuffs, are sent to Bafora; and return with dried fruits, rose-water, and a quantity of gold. The rich merchandise carried to Arabia is paid for entirely in gold and silver. The trade of the Ganges with the other sea-ports of India brings 1,225,000 l. annually into Bengal.

Though this trade passes through the hands of the Europeans, and is carried on under their protection, it is not entirely on their own account. The Moguls, indeed, who are usually satisfied with the places they hold under the government, have seldom any concern in these expeditions; but the Armenians, who, since the revolutions in Persia, are settled upon the banks of the Ganges, to which they formerly only made voyages, readily throw their capitals into this trade. The Indians employ still larger sums in it. The impossibility of enjoying their fortunes under an oppressive government does not deter the natives of this country from labouring incessantly to increase them. As they would run too great a risque by engaging openly in trade, they are obliged to have recourse to clandestine methods. As soon as an European arrives, the Gentoo brokers, who know mankind better than is commonly supposed, study his character; and, if they find him frugal, active, and well informed, offer to act as his brokers and cashiers, and lend or procure him money upon bottomry, or at interest. This interest, which is usually nine *per cent.* at least, is higher when he is under a necessity of borrowing of the Cheyks.

These Cheyks are a powerful family of Indians, who have, time immemorial, inhabited the banks of the Ganges. Their riches have long ago procured them the management of the bank belonging to the court, the farming of the public revenue, and the direction of the money, which they coin afresh every year in order to receive annually the benefit arising from the mint. By uniting so many advantages, they are enabled to lend the government 1,750,000 l. 2,625,000 l. or even 4,375,000 l. at a time. When the government finds it impossible to refund the money, they are allowed to indemnify themselves by oppressing the people. That so prodigious a capital should be preferred in the centre of tyranny, and in the midst of revolutions, appears incredible. It is not possible to conceive how such a structure could be raised, much less how it could be supported for so long a time. To explain the mystery, it must be observed, that this family has always maintained a superior influence at the court of Delhi; that the Nabobs and Rajahs in Bengal are dependent upon it; that those who are about the person of the subah have constantly been its creatures; and that the subah himself has been maintained or dethroned by the intrigues of this family. To this we may add, that the different branches of it, and the wealth belonging to them, being dispersed, it has never been possible to ruin above one half of the family at a time, which would still

Gentoo brokers.

Cheyks, a powerful Indian family.

Pegu.

Beng. 1. still have left them more resources than were necessary to enable them to pursue their revenge to the utmost. The Europeans who frequent the Ganges have not been sufficiently alarmed at this despotism, which ought to have prevented them from submitting to a dependence upon the Cheyks. They have fallen into the snare, by borrowing considerable sums of these avaricious financiers, apparently at nine, but in reality at thirteen, *per cent.* if we take into the account the difference between the money that is lent them, and that in which they are obliged to make their payments. The engagements entered into by the French and Dutch companies have been kept within some bounds; but those of the English company have been unlimited. In 1755, they were indebted to the Cheyks about 1,225,000 l.

Such is the conduct of this considerable set of men, who are sole managers of the European trade at Bengal. The Portuguese, who first frequented this rich country, had the wisdom to establish themselves at Chatigan, a port situated upon the frontier of Arracan, not far from the most eastern branch of the Ganges. The Dutch, who, without incurring the resentment of an enemy at that time so formidable, were desirous of sharing in their good fortune, were engaged in searching for a port which, without obstructing their plan, would expose them the least to hostilities. In 1603, their attention was directed to Balafore; and all the companies, rather through imitation than in consequence of any well concerted schemes, followed their example. Experience taught them the propriety of fixing as near as possible to the markets from whence they had their merchandise; and they sailed up that branch of the Ganges which, separating itself from the main river at Mourcha above Callimbuzar, falls into the sea near Balafore under the name of the river *Hughly*. The government of the country permitted them to erect warehouses wherever there was plenty of manufactures, and to fortify themselves upon this river.

7
Principal
towns.

The first town that is met with in passing up the river is Calcutta, the principal settlement of the English company. See CALCUTTA.

Six leagues higher is situated Frederic Nagore, founded by the Danes in 1756, in order to supply the place of an ancient settlement where they could not maintain their ground. This new establishment has not yet acquired any importance, and there is all the reason imaginable to believe that it will never become considerable.

Two leagues and an half higher, lies Chandernagore, a settlement belonging to the French *.

At the distance of a mile from Chandernagore, is Chinfura, better known by the name of *Doughli*, being situated near the suburbs of that anciently renowned city. The Dutch have no other possessions there, but merely their fort; the territory round it depending on the government of the country, which hath frequently made it feel its power by its extortions. Another inconvenience attending this settlement is a sand-bank that prevents ships from coming up to it: they proceed no further than Tulta, which is 20 miles below Calcutta; and this of course occasions an additional expense to the government.

The Portuguese had formerly made Bandel, which is eighty leagues from the mouth of the Ganges, and a quarter of a league above the *Hughly*, the principal

seat of their commerce. Their flag is still displayed, and there are a few unhappy wretches remaining there, who have forgotten their country after having been forgotten by it. This factory has no other employment than that of supplying the Moors and the Dutch with mistresses.

The exports from Bengal to Europe consist of musk, Exports gum-lac, nicaragua wood, pepper, cowries, and some other articles of less importance brought thither from other places. Those that are the immediate produce of the country are borax, salt-petre, silk-stuffs, muslins, and several different sorts of cottons.

It would be a tedious and useless task to enumerate all the places where ticken, and cottons, fit for table linen or intended to be worn, plain, painted, or printed, are manufactured. It will be sufficient to refer to *Daca*, which may be looked upon as the general mart of Bengal, where the greatest variety of finest cottons are to be met with, and in the greatest abundance. See DACA.

The sum total of the purchases made in Bengal by the European nations amounted, a few years ago, to no more than 870,000 l. One third of this sum was paid in iron, lead, copper, woollens, and Dutch spices: the remainder was discharged in money. Since the English have made themselves masters of this rich country, its exports have been increased, and its imports diminished, because the conquerors have carried away a greater quantity of merchandise, and pay for it out of the revenues they receive from the country. There is reason to believe, that this revolution in the trade of Bengal has not arrived at its crisis, and that sooner or later it will be attended with more important consequences and effects.

The conquest of Bengal by the British, which we now are to relate, is an event scarce less remarkable for its splendour and importance, than for the peculiarity of the circumstances that gave it birth; circumstances which, far from promising to open such a field of glory and power, seemed to threaten them with the most fatal reverse of fortune.

A pernicious custom had for some time prevailed in this part of Asia. The governors of all the European settlements took upon them to grant an asylum to such of the natives of the country as were afraid of oppression or punishment. As they received very considerable sums in return for their protection, they overlooked the danger to which the interests of their principals were exposed by this proceeding. One of the chief officers of Bengal, who was apprised of this resource, took refuge among the English at Calcutta, to avoid the punishment due to his treachery. He was taken under their protection. The subah, justly irritated, put himself at the head of his army, attacked the place, and took it. He put the garrison into a close dungeon, where they were suffocated in the space of 12 hours. Three and twenty of them only remained alive. These wretched people offered large sums to the keeper of their prison, to prevail upon him to get their deplorable situation represented to the prince. Their cries and lamentations were sufficient informations to the people, who were touched with compassion; but no one would venture to address the despotic monarch upon the subject. The expiring English were told that he was asleep; and there was not, perhaps, a single person

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* See Chandernagore.

person in Bengal who thought that the tyrant's slumbers should be interrupted for one moment, even to preserve the lives of 150 unfortunate men.

Admiral Watson, who was just arrived in India with his squadron, and colonel Clive who had so remarkably distinguished himself in the war of the Carnatic, did not delay to avenge the cause of their country. They got together the English who had been dispersed, and were flying from place to place; they went up the Ganges in the month of December 1756, retook Calcutta, made themselves masters of several other places, and gained a complete victory over the subah.

Such a rapid and extensive success becomes in a manner inconceivable, when we consider that it was only with a body of 500 men that the British were to stand against the whole force of Bengal. But if their superiority was partly owing to their better discipline, and to other evident advantages that the Europeans have in battle over the Indian powers; the ambition of eastern chiefs, the avarice of their ministers, and the nature of a government whose only springs are fear and present interest, were of still more effectual service to them: they had experience enough to take advantage of the concurrence of these several circumstances in their first as well as in every succeeding enterprise. The subah was defeated by all his own people, as tyrants generally are; the principal officers sold their interest to the English; he was betrayed at the head of his army, the greatest part of which refused to engage; and he himself fell into the hands of his enemies, who caused him to be strangled in prison.

They disposed of the subahship in favour of Jaffier-Ally-Khan, the ring-leader of the conspiracy; who ceded to the company some provinces, with a grant of every privilege, exemption, and favour, to which they could have any pretension. But soon growing weary of the yoke he had brought upon himself, he was secretly looking out for means to get rid of it. His designs were discovered, and he was confined in the centre of his own capital.

Cosim-Ally-Khan, his nephew, was proclaimed in his stead. He had purchased that usurpation with an immense sum of money. But he did not enjoy it long. Impatient of the yoke, as his predecessor had been, he gave some tokens of his disposition, and refused to submit to the laws the company imposed upon him. Upon this the war broke out again. The same Jaffier-Ally-Khan, whom the English kept in confinement, was again proclaimed subah of Bengal. They marched against Cosim-Ally-Khan. His general officers were corrupted; he was betrayed and entirely defeated: too happy, that, whilst he lost his dignity, he still preserved the immense treasures he had amassed.

Notwithstanding this revolution, Cosim-Ally did not drop his hopes of vengeance. Full of resentment, and loaded with treasure, he set out for the nabob of Benares, chief vicer in the Mogul's empire. He and all the neighbouring princes re-united in opposition to the common enemy, who threatened them all equally. But now the contest lay no longer between them and a handful of Europeans just arrived from the coast of Coronandel; they were to engage with the whole strength of Bengal, of which the British were masters. Elated with their successes, they did not wait to be attacked: they set out directly, and made head against fo-

formidable a league; marching on with all the confidence which Clive could inspire, a leader whose name seemed to have become the pledge of conquest. However, Clive did not care to hazard any thing. Part of the campaign was spent in negotiations; but in time the treasures which the English had already drawn from Bengal, served to ensure them new conquests. The heads of the Indian army were corrupted; and when the nabob of Benares was desirous of coming to action, he was obliged to fly with his men without ever being able to engage.

By this victory, the country of Benares fell into the hands of the British; and it seemed as if nothing could hinder them from annexing this sovereignty to that of Bengal: but, either from moderation or prudence, they were content to levy 8,000,000*l.* by contribution: and they offered peace to the nabob on conditions which would render him incapable of doing them any hurt; but such as they were, he most readily agreed to them, that he might regain the possession of his own provinces.

In the midst of these calamities, Cosim-Ally still found means to preserve part of his treasures, and retired to the Cheyks, a people situated in the neighbourhood of Delhi, from whence he made an attempt to procure some allies, and to raise up a body of enemies to oppose the British.

While matters were thus circumstanced in Bengal, the Mogul having been driven out of Delhi by the Patans, by whom his son had been set up in his room, was wandering from one province to another in search of a place of refuge in his own territories, and requesting succour from his own vassals, but without success. Abandoned by his subjects, betrayed by his allies, without support, and without any army, he was allured by the power of the English, and implored their protection: they promised to conduct him to Delhi, and re-establish him on his throne; but they insisted that he should previously cede to them the absolute sovereignty over Bengal. This cession was made by an authentic act, and attended with all the formalities usually practised throughout the Mogul empire.

The English, possessed of this title, which was to give a kind of legitimacy to their usurpation, at least in the eyes of the vulgar, soon forgot the promises they had made. They gave the Mogul to understand, that particular circumstances would not suffer them to be concerned in such an enterprise; that some better opportunity was to be hoped for; and to make up for all his losses, they assigned him a pension of 262,500*l.* with the revenue of Illahabad, and Sha Ichanabad or Delhi; upon which that unfortunate prince was reduced to submit himself in one of the principal towns of the province of Benares, where he had taken up his residence. Thus the Mogul empire comes to be shared between two governing powers, one of which is acknowledged in the several districts of India where the English company has any establishments and authority; the other in such provinces as border on Delhi, and in those parts to which the influence of that company does not extend.

The British, thus become sovereigns of Bengal, have thought it incumbent on them to keep up the shadow of ancient forms, in a country where they have the lead, and, perhaps, the only power that is likely to be secure and

Bengal.

16
Defeated, and the country of Benares laid under contribution.

17
Sovereignty of Bengal ceded to the British by the Mogul.

18
Ancient government in appearance preserved.

Bengal.

and lasting. They govern the kingdom still under the name of a *subah*, who is of their nomination and in their pay, and seems to give his own orders. It is from him that all public acts seem to proceed and issue, tho' the decrees are in fact the result of the deliberations of the council at Calcutta; so that the people, notwithstanding their change of masters, have for a considerable time been induced to believe that they still submitted but to the same yoke.

19
Revenues
from Ben-
gal.

If we should wish to know the amount of the public revenues of Bengal, we shall find, that at the period of its conquest it was equal to 3,500,000 l. The outgoings, either for the government or defence of the province, were stated at 1,797,750 l.; 262,500 l. were agreed to be given to the Mogul, and 131,250 l. to the nabob; so that the remainder to the company was 1,312,500 l. Their purchases in the different marts of India should absorb a great part of this sum; but still it has been thought there must after all remain a surplus of several millions to be carried into great Britain.

20
Methods
for securing
its subjec-
tion.

This new arrangement of matters, without having wrought any sensible change in the exterior form of the English company, has essentially changed their object. They are no longer a trading body; they are a territorial power which farm out their revenues in aid of a commerce that formerly was their sole existence, and which, notwithstanding the extension it has received, is no more than an additional object in the various combinations of their present real grandeur. The arrangements intended to give stability to a situation so prosperous are, perhaps, the most reasonable that can be. Britain has at present in India an establishment to the amount of 9800 European troops, and 54,000 sipahis well armed and well disciplined. Three thousand of these Europeans and 25,000 sipahis are dispersed along the borders of the Ganges.

The most considerable body of these troops has been stationed in Bennes, once the source of Indian science, and still the most famous academy of these rich countries, where European avarice pays no regard to any thing. This situation is chosen, because it appeared favourable for stopping the progress of those warlike people who might descend from the mountains of the north; and in case of attack, the maintaining of a war in a foreign territory would be less ruinous than in the countries of which the company is to receive the revenues. On the south, as far as it has been found practicable, they have occupied all the narrow passes by which an enterprising and active adversary might attempt to penetrate into the province. Daca, which is in the centre of it, has under its walls a considerable force always ready to march wherever their preference may be necessary. All the nabobs and rajahs who are dependent on the subah of Bengal are disarmed, surrounded by spies in order to discover their conspiracies, and by troops to render them ineffectual.

21
Former lau-
dable con-
duct of the
English.

The English company till these latter times had always held a conduct superior to that of the other settlements. Their agents, their factors, were well chosen. The most part of them were young men of good families, already instructed in the rudiments of commerce, and who were not afraid, when the service of their country called upon them, to cross those immense seas which Britain considers but as a part of her empire. The company had generally taken their com-

merce in a great point of view, and had almost always carried it on like an association of true politicians as well as a body of merchants. Upon the whole, their planters, merchants, and soldiers, had retained more honestly, more regularly, and more firmness, than those of the other nations.

Who would ever have imagined that this same company, by a sudden alteration of conduct and change of system, could possibly make the people of Bengal regret the despotism of their ancient masters? That fatal revolution has been but too sudden and too real. A settled plan of tyranny has taken the place of authority occasionally exerted. The exactions are become general and fixed, the oppression continual and absolute. The destructive arts of monopolies are carried to perfection, and new ones have been invented. In a word, the company have tainted and corrupted the public sources of confidence and happiness.

Under the government of the Mogul emperors, the subahs, who had the care of the revenues, were, from the nature of the business, obliged to leave the receipt of them to the Nabobs, Polygars, and Jemidars, who were a sort of under-security to other Indians, and these still to others; so that the produce of the lands passed on, and was partly sunk amidst a multitude of intermediate hands, before it came into the coffers of the subah, who, on his part, delivered but a very small portion of it to the emperor. This administration, faulty in many respects, had in it one favourable circumstance for the people, that the farmers never being changed, the rent of the farms remained always the same; because the least increase, as it disturbed the whole chain of advantage which every one received in his turn, would infallibly have occasioned a revolt: a terrible resource, but the only one left in favour of humanity in countries groaning under the oppressions of despotic rulers.

It is probable that in the midst of these regulations there were many injuries and partial distresses. But, at least, as the receipt of the public moneys was made upon a fixed and moderate assessment, emulation was not wholly extinguished. The cultivators of the land, being sure of laying up the produce of their harvest after paying with exactness the rate of their farm, assisted the natural goodness of the soil by their labour; the weavers, masters of the price of their works, being at liberty to make choice of the buyer which best suited them, exerted themselves in extending and improving their manufactures. Both the one and the other, having no anxiety with regard to their subsistence, yielded with satisfaction to the most delightful inclinations of nature, or the prevailing propensity of these climates; and beheld in the increase of their family nothing more than the means of augmenting their riches. Such are evidently the reasons why industry, agriculture, and population, have been carried to such a height in the province of Bengal. One would think they might still be carried further under the government of a free people, friends to humanity; but the thirst of money, the most tormenting, the most cruel of all passions, has given rise to a pernicious and destructive government.

The English, become sovereigns of Bengal, not content to receive the revenues on the same footing as adopted the ancient subahs, have been desirous at once to aug-

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ment the produce of the farms, and to appropriate to themselves the rents. To accomplish both these objects, they are become the farmers to their own subahs, that is, to a slave on whom they have just conferred that empty title, the more securely to impose upon the people. The consequence of this new plan has been to pillage the farmers, in order to substitute in their room the company's agents. They have also monopolized the sale of salt, tobacco, and betel, articles of immediate necessity in those countries; but they have done this under the name, and apparently on the account of, the subah. They have gone still further, and have obliged the very same subah to establish in their favour an exclusive privilege for the sale of cotton brought from any other province, in order to raise it to an exorbitant price. They have augmented the duties, and, to conclude all, have obtained an edict, which has been published, to forbid all Europeans, except the English, from trading freely in the interior parts of Bengal.

When we reflect on this cruel prohibition, it seems as if it had been contrived only to deprive of every power of mischief that unfortunate country, whose prosperity, for their own interest, ought to be the only object of the English company. Besides, it is easy to see, that the avarice of the members of the council at Calcutta has dictated that shameful law. Their design was to ensure to themselves the produce of all the manufactures, in order to compel the merchants of other nations, who chose to trade from one part of India to another, to purchase these articles of them at an exorbitant price, or to renounce their undertakings.

But still in the midst of this overbearing conduct, so contrary to the advantage of their constituents, these treacherous agents have attempted to disguise themselves under the mask of zeal. They have pretended, that as they were under the necessity of exporting to England a quantity of merchandise proportioned to the extent of her commerce, the competition of private traders was prejudicial to the purchases of the company.

Under the same pretence, and in order to extend this exclusion to the foreign settlements while they appear to respect their rights, they have of late years ordered more merchandise than Bengal could furnish. At the same time the weavers have been forbidden to work for other nations until the English orders were completed. Thus the workmen, not being any longer at liberty to chuse among the several purchasers, have been forced to deliver the fruits of their labour at any price they could get for them.

If to the picture of public distresses we were to add that of private extortions, we should find the agents of the company, almost every where, exacting their tribute with extreme rigour, and raising contributions for them with the utmost cruelty. We should see them carrying a kind of inquisition into every family, and sitting in judgment upon every fortune; robbing indiscriminately the artisan and the labourer, imputing it as a crime that he is not sufficiently rich, and punishing him accordingly. We should view them selling their favour and their credit, as well to oppress the innocent as to screen the guilty. We should find, in consequence of these irregularities, despair seizing every heart, and an universal dejection getting the better of every mind, and uniting to put a stop to the progress and activity of commerce, agriculture, and population.

It will be thought, without doubt, after these details, it was impossible that Bengal should have fresh evils to dread. But, however, as if the elements, in league with mankind, had intended to bring all at once upon the same people, every calamity that by turns lays waste the universe, a drought, of which there had never been an instance in those climates, came upon them, and prepared the way for a most dreadful famine in a country of all the most fertile.

In Bengal they have two harvests; one in April, the other in October. The first, called the *little harvest*, consists of the smaller grain: the second, styled the *grand harvest*, is singly of rice. The rains which commence regularly in the month of August, and end in the middle of October, are the occasion of these different productions; and it was by a drought which happened in 1769, at the season when the rains are expected, that there was a failure in the great harvest of 1769, and the less harvest of 1770. It is true, that the rice on the higher grounds did not suffer greatly by this disturbance of the seasons; but there was far from a sufficient quantity for the nourishment of all the inhabitants of the country: add to which, the English, who were engaged before hand to take proper care of their subsistence, as well as of the sipahis belonging to them, did not fail to keep locked up in their magazines a part of the grain, though the harvest was insufficient.

They have been accused of having made a very bad use of that necessary foresight, in order to carry on the most odious and the most criminal of all monopolies. It may be true, that such an infamous method of acquiring riches may have tempted some individuals: but that the chief agents of the company, that the council of Calcutta, could have adopted and ordered such a destructive scheme; that, to gain a few millions of rupees, the council should coolly have devoted to destruction several millions of their fellow creatures, and by the most cruel means; this is a circumstance we never can give credit to. We even venture to pronounce it impossible; because such wickedness could never enter at once into the minds and hearts of a set of men, whose business it is to deliberate and act for the good of others.

But still this scourge did not fail to make itself felt throughout the extent of Bengal. Rice, which is commonly sold at $\frac{1}{4}$ d. for three pounds, was gradually raised till it came so high as to be sold at 2d. per pound, and it was even up to about 3d.; neither indeed was there any to be found, except in such places where the Europeans had taken care to collect it for their own use.

The unhappy Indians were every day perishing by thousands under this want of sustenance, without any means of help and without any resource, not being able to procure themselves the least nourishment. They were to be seen in their villages, along the public ways, in the midst of our European colonies, pale, meagre, fainting, emaciated, consumed by famine; some stretched on the ground in expectation of dying, others scarce able to drag themselves on to seek for any nutriment, and throwing themselves at the feet of the Europeans, intreating them to take them in as their slaves.

To this description, which makes humanity shudder, let us add other objects equally shocking; let imagination enlarge upon them, if possible; let us represent to ourselves infants deserted, some expiring on the breast

Bengal.

of their mothers; every where the dying and the dead mingled together; on all sides the groans of sorrow, and the tears of despair; and we shall then have some faint idea of the horrible spectacle Bengal presented for the space of six weeks.

26
Three mil-
lions perish
by famine.

During this whole time the Ganges was covered with carcases; the fields and highways were choked up with them; infectious vapours filled the air, and diseases multiplied; and one evil succeeding another, it was likely to happen, that the plague might have carried off the remainder of the inhabitants of that unfortunate kingdom. It appears, by calculations pretty generally acknowledged, that the famine carried off a fourth part, that is to say, about 3,000,000.

But it is still more remarkable, and serves to characterize the gentleness, or rather the indolence, as well moral as natural, of the natives, that amidst this terrible distress, such a multitude of human creatures, pressed by the most urgent of all necessities, remained in an absolute inactivity, and made no attempts whatever for their self-preservation. All the Europeans, especially the English, were possessed of magazines, and even these were not touched; private houses were so too; no revolt, no massacre, nor the least violence prevailed. The unhappy Indians, resigned to despair, confined themselves to the request of succour they did not obtain, and peaceably waited the relief of death.

Let us now represent to ourselves any part of Europe afflicted by a similar calamity. What disorder! what fury! what atrocious acts! what crimes would ensue! How should we have seen, among us Europeans, some contending for their food with their dagger in hand, some pursuing, some flying, and without remorse massacring one another! how should we have seen men at last turn their rage on themselves, tearing and devouring their own limbs, and, in the blindness of despair, trampling under foot all authority, as well as every sentiment of nature and reason!

27
Culpability
of the Eu-
glis.

Had it been the fate of the English to have had the like events to dread on the part of the people of Bengal, perhaps the famine would have been less general and less destructive. For setting aside, as perhaps we ought, every charge of monopoly, no one will undertake to defend them against the reproach of negligence and insensibility. And in what crisis have they merited that reproach? in the very instant of time when the life or death of several millions of their fellow-creatures was in their power. One would think, that, in such an alternative, the very love of human-kind, that sentiment innate in all hearts, might have inspired them with resources. Certain it is, that by timely exertions much of the misery that ensued might have been prevented. The barrenness had been announced by a drought; and it is not to be doubted, that if, instead of having solely a regard to themselves, and remaining in an entire negligence of every thing else, they had from the first taken every precaution in their power, they might have accomplished the preservation of many lives that were lost.

We must allow that the corruption to which the English have given themselves up from the first beginning of their power, the oppression which has succeeded it, the abuses every day multiplying, the entire loss of all principle; all these circumstances together form a contrast totally inconsistent with their

past conduct in India, and the real constitution of their government in Europe. But this sort of problem in morals will be easily solved, upon considering with attention the natural effect of circumstances and events. Being now become absolute rulers in an empire where they were but traders, it was very difficult for the English not to make a bad use of their power. At a distance from home, men are no longer restrained by the fear of being ashamed to see their countrymen. In a warm climate where the body loses its vigour, the mind must lose some of its strength. In a country where nature and custom lead to indulgence, men are apt to be seduced. In countries where they come for the purpose of growing rich, they easily forget to be just.

BENGO, a province of the kingdom of Angola in Africa, having the sea on the west, and the province of Mosche on the east. It produces plenty of banana trees; but the Portuguese have grubbed up vast quantities of these, and cultivated the land, which now abounds with maize, and the manioc root of which they make bread†. The province is divided into a great number of districts, of which the chiefs are natives, but tributary to Portugal, and obliged to till the lands belonging to the Portuguese. They are Christians, and have eight churches.

† See
tropical

BENGUELA, a province of the kingdom of Angola in Africa, bounded on the east by the river Rianza, on the north by the Coanza, and it extends westward quite to Cape Negro. Benguela was formerly governed by its own kings; but was entirely ruined by the incursions of the barbarous Giagas, so that its being conquered by the Portuguese proved a great happiness. It still retains the title of *kingdom*, and is allowed to enjoy some small privileges; but is far from being restored to the state of plenty it enjoyed before its destruction by the Giagas already mentioned. It produces abundance of salt, but inferior in quality to that which is made in the province of Chissama. The zimbis also, whose shells are current as money through many countries of Africa, are caught upon the coast. The country, which is mostly mountainous, abounds with elephants, rhinoceroses, lions, tigers, crocodiles, &c. which are very dangerous, and destroy great numbers of cattle.

BENJAMIN. See LAURUS, and BENZON.

BENIARAX, an ancient and considerable town in the kingdom of Algiers in Africa, seated in W. Long. o. 30. N. Lat. 35. o.

BENIN, a country of Guinea, in Africa, has part of the gulph called the *Bite of Benin*, and the Slave Coast, on the west; part of Gago and Biafara, on the north; Myjac and Makoko, on the east; and Congo on the south, where it extends about one degree beyond the equinoctial line: the length, from east to west, is about 600 miles; but its north and south bounds are not so well determined. The land in general is low, and woody; in some parts it has rivers and lakes, but in others there is a scarcity of water. There are here a great number of wild beasts, particularly elephants, lions, tygers, leopards, baboons, monkeys, wild boars, deer, &c. The birds are partridges, of which some are blue and some green, turtles, wild ducks, woodcocks, &c. Their grain is Indian corn: they have no potatoes; but plenty of yams, which are of the potatoe kind, but vastly larger and more coarse: these are their ordinary

ordinary food, and serve in the room of bread; they have two sorts of beans, like horse-beans, but not near so good. The fruits are cocoa-nuts, cormantine apples, bananas, wild figs, &c.

The negroes have several colours which might serve for painting, and a good sort of soap made with palm-oil and wood-ashes; they have a great deal of cotton, which not only serves for their own use, but is exported to distant places. The river Rio or Benin has a great many arms; some of which are so large, that they deserve the name of rivers: it abounds with fish, which the inhabitants eat smoke-dried as well as fresh. The place of trade in this river is at Arebo, about 120 miles distant from its mouth; and to this place the ships may sail up. Those who take this voyage see the mouths of a great many rivers fall into the principal channel to the right and the left; but how far it ascends into the country is not known. A little higher up, the country is very low and marshy, and seems to be divided into islands; and yet there are trees of all sizes growing on the banks; this renders the country very unhealthy, as many of our British sailors have found to their cost; it is also incommoded with vast numbers of flies, called *mosquitos*, which sting terribly, and render the skin full of pustules. There are three principal villages, to which the negroes come from the inland countries to traffic. One is called *Bodadou*, and consists of about 50 houses, or rather huts, for they are made with reeds and covered with leaves. The second, called *Arebo*, was mentioned above: this is much larger than the former, and pretty well stocked with inhabitants; and the houses have much more room, but they are built after the same manner. The third has the name of *Agaton*, and was built upon a hill. It was almost ruined by the wars; but the negroes lately rebuilt it, on account of its agreeable situation. Great Benin is the place of residence of the king.

The inhabitants of Benin are very exact in their trading, and will not recede from any of their old customs: this renders them very slow in their dealings, and backward to pay their debts, which sometimes obliges the traders to sail before they receive satisfaction; but then they are paid as soon as they return. Some of the merchants are appointed by the government, which demands a sort of custom; but it is very trifling. There are three sorts of officers under the king; the first are always near him, and none can address him but by their means: there are several of the second sort; one takes care of the slaves, another of the cattle, another of the streets, another of war, and so on.

Children go almost naked till they are 14, and then they wrap a cotton cloth round their middles: the richer sort put on a sort of callico gowns when they go abroad, with a kind of drawers; but within they are contented with their usual cloth: the better sort of women wear their cotton cloths like petticoats, and have a covering round their shoulders, but take care it shall be open before.

The richer sort of the inhabitants of Benin live upon beef, mutton, and poultry; their drink is water, and brandy when they can get it. The poorer sort live upon dried fish, bananas, and beans; their drink is water and palm-wine. Their chief handicraft men are smiths, carpenters, and curriers; but they perform all

their work in a very bungling manner. The men have as many wives as they can keep, which they take without any ceremony, except treating their relations. The wives of the lower sort may go wherever they have a mind; but those of the rich are shut up: they allow their wives to be very familiar with the Europeans, and yet pretend to be very jealous of their own countrymen. When a woman is caught in adultery, she is turned away, and the goods of the man are forfeited to the husband; but if the relations of the woman are rich, they prevail with him to overlook the fault by dint of presents.

They use circumcision, which is performed seven days after the children are born, at which time the father makes a feast for the relations; they have also customs, relating to uncleanness, resembling those of the Jews. Thieves are punished by making the party amends, if they can, or otherwise they are bastinadoed; but murder is always punished with death. When a person is only suspected of a crime, they have several ways of putting him to a trial, like the fire ordeal, or the bitter water of the Jews; but they are of such a nature, that the innocent may be as often condemned as the guilty.

With regard to their religion, they believe in an almighty and invisible God; yet worship images in a human form, and in those of all sorts of animals, making them offerings, every one being his own priest: they look upon these lesser deities as mediators between him and man; some of these idols are in the house, and some in cabins by themselves. Every fifth day is holy; on which the rich kill cows, sheep, and goats, and others dogs, cats, and fowls, which they distribute among their poor neighbours.

BENIN, the capital of a kingdom of the same name, is the residence of their kings, and is seated pretty far in the country: it stands in a plain, and is about four miles in compass. The streets are long and broad; and there are markets twice a-day, where they sell cows, cotton, elephants teeth, European merchandizes, and whatever the country produces. The houses are large, with clay walls, and at a distance from each other; they are covered with reeds, straw, and leaves. The women in this place are the greatest slaves; for they go every day to market, manage the household affairs, take care of the children, cook the victuals, and till the ground. The king's palace makes great part of the town; and, its great extent excepted, there is nothing worth taking notice of, it being only a confused heap of buildings, made with boards and clay, without regularity or neatness. In the middle, there is a wooden tower, about 70 feet high, made like a chimney; and on the top is a brazen serpent, hanging with his head downwards: this is pretty well made, and is the most curious thing in the town: there is a gallery of statues, but so wretchedly carved, that there is no knowing what they represent without being told: behind a curtain, there are 11 brazen heads, with an elephant's tooth on each; these are the king's idols: his throne is made of ivory, on which he sits in a pavilion of India stuff. The king shows himself but once a-year, on the day of a certain festival; and then he is surrounded with his wives and a great number of his officers, who walk out in procession to begin the feast by sacrificing to their gods; this done, he bestows vic-

Benish,
Bennet.

tuals and wine among the multitude, which is imitated by his officers. All the inhabitants of this town and country go under the denomination of the king's slaves; and some relations say, that none of them wear any habit till given them by the king: but this seems to be only a salvo to account for the great number of men and women that are daily seen naked in the streets; for if it be true, that the king of Benin can bring 100,000 fighting men into the field, his subjects must be very numerous; and probably his majesty is not rich enough to bestow garments upon them all. The Europeans resort hither to purchase slaves. E. Long. 5. 4. N. Lat. 7. 40.

BENISH-DAYS, among the Egyptians, a term for three days of the week, which are days of less ceremony in religion than the other four, and have their name from the *benish*, a garment of common use, not of ceremony. In Cairo, on Sundays, Tuesdays, and Thursdays, they go to the pashaw's divan; and these are the general days of business. Fridays they stay at home, and go to their mosques at noon; but, though this is their day of devotion, they never abstain from business. The three other days of the week are the *benish-days*, in which they throw off all business and ceremony, and go to their little summer-houses in the country.

BENNET (Henry), earl of Arlington, was born of an ancient family in Middlesex. In the beginning of the civil war, he was appointed under-secretary to George Lord Digby, secretary of state; afterward entered himself as a volunteer for the royal cause, and did his majesty good service, especially at Andover in Hampshire, where he received several wounds. When the wars were ended, he left not the king when success did, but attended his interest in foreign parts. He was made secretary to the duke of York; received the honour of knighthood from Charles II. at Bruges, in 1658; and was sent envoy to the court of Spain. His majesty, upon his return to England, called him home, made him keeper of his privy purse, and principal secretary of state. He had always a peculiar hatred to the lord chancellor Hyde; who, on the other hand, considered him as a concealed Papist. In 1670 he was one of the council distinguished by the title of the *Cabal*, and one of those who advised shutting up the exchequer. In 1672 he was made Earl of Arlington and Viscount Thetford, and soon after Knight of the Garter. In 1673, he was appointed one of the three plenipotentiaries from the court of Great Britain to Cologne, to mediate a peace between the emperor and the king of France. The house of Commons, in 1673, drew up articles of impeachment against him. In 1674 he was made chamberlain of his majesty's household, with this public reason, that it was in recompense of his long and faithful service, and particularly for his having performed the office of principal secretary of state for the space of 12 years, to his majesty's great satisfaction. But afterward his interest began to decline, while that of the earl of Danby increased; for upon his return from his unsuccessful journey to Holland in 1675, his credit was so much sunk, that several persons at court diverted the king with mimicking his person and behaviour; yet he held his lord chamberlain's place to the day of his death, in 1685. His esteemed letters to Sir William Temple were published after his

death.

BENNET (Christopher), an eminent physician in the 16th century, was the son of John Bennet, of Raynton, in Somersetshire. He was educated at Lincoln college, Oxford; and gave the public a treatise on consumptions, intitled, *Theatri Tabidorum Vesibulum, &c. also Exercitationes Diagnostice, cum Historiis demonstrativis, quibus Alimentorum et Sanguinis vitia deteguntur in perisique morbis, &c.*

BENNET (Dr Thomas), an eminent divine, born at Salisbury, on the 7th of May, 1673, and educated at St John's college, Cambridge. In 1700, he was made rector of St James's, in Colchester; afterwards he was lecturer of St Olave's, Southwark, and morning-preacher at St Lawrence, Jewry; and at last was presented to the vicarage of St Giles's, Cripple-gate, worth 500 l. a year. While he was in this station, he was engaged in several expensive law-suits in defence of the rights of the church, to which he recovered 150 l. a-year. He wrote, 1. An answer to the Dissenters Plea for Separation. 2. A Confutation of Popery. 3. A Discourse of Schism. 4. An Answer to a book intitled Thomas against Bennet. 5. A confutation of Quakerism. 6. A brief History of the joint Use of pre-conceived Forms of Prayer. 7. An Answer to Dr Clarke's Scripture-doctrine of the Trinity. 8. A Paraphrase, with Annotations, on the Book of Common-Prayer. 7. An Hebrew Grammar; and other pieces. He died October 9th, 1728, in the 56th year of his age.

BENOIT (Renatus), a famous doctor of the Sorbonne, and curate of Eustathius at Paris in the 16th century. He was a secret favourer of the Protestant religion; and that his countrymen might be able to read the bible in their own tongue, he published at Paris the French translation, which had been made by the reformed ministers at Geneva. This translation was approved of by several doctors of the Sorbonne before it went to the press, and King Charles IX. had granted a privilege for the printing of it. Yet when it was published, it was immediately condemned. He had been before that time confessor to the unhappy Mary queen of Scotland, during her stay in France, and attended her when she returned into Scotland. Some time before the death of Henry III. Dr Benoit, or some of his friends with his assistance, published a book intitled, *Apologie Catholique*, i. e. The Catholic Apology; in which it was shewed, that the Protestant religion, which Henry king of Navarre professed, was not a sufficient reason to deprive him of his right of succeeding to the crown of France. When Henry IV. was resolved to embrace the Catholic religion, he assisted at that assembly in which King Henry abjured the reformed religion. The king promoted him to the bishoprick of Troyes in Champagne 1597, but he could never obtain the pope's bulls to be intalled. However, he enjoyed the temporalities of that bishoprick till he resigned it. He died in 1608.

BENSERADE (Isaac de), an ingenious French poet of the 17th century, was born at Lyons. He made himself known at court by his verses and his wit, and had the good fortune to please the cardinals de Richlieu and Mazarin. After the death of Richlieu, he got into favour with the duke de Breze, whom he accompanied in most of his expeditions; and when this nobleman

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man died, he returned to court, where his poetry became highly esteemed. He wrote, 1. A Paraphrase upon Job. 2. Verses for Interludes. 3. Rondeaux upon Ovid. 4. Several Tragedies. A *sonnet* which he sent to a young lady with his paraphrase on Job, being put in competition with the *Urania* of Voiture, caused him to be much spoken of; for what an honour was it to be head of a party against this celebrated author? Those who gave the preference to Benferade's performance were styled the *Jobists*, and their antagonists the *Uranists*; and the dispute long divided the whole court and the wits. Some years before his death, he applied himself to works of piety, and translated almost all the Psalms.

M. L'Abbe Olivet says, that Benferade, towards the latter end of his life, withdrew from court, and made Gently the place of his retirement. When he was a youth, he says it was the custom to visit the remains of the ornaments with which Benferade had embellished his house and gardens, where every thing favoured of his poetical genius. The barks of the trees were full of inscriptions; and, amongst others, he remembers the first which presented itself was as follows:

*Adieu fortune, honneurs, adieu vous et les vôtres,
Je viens ici vous oublier,
Adieu toi-même amour, bien plus que les autres
Difficile à congédier.*

Fortune and honours, all adieu,
And whatsoever belong to you.
I to this retirement run,
All your vanities to shun.
Thou too adieu, O powerful love;
From thee 'tis hardiest to remove.

Mr Voltaire is of opinion that these inscriptions were the best of his productions, and he regrets that they have not been collected.

Benferade suffered at last too much from the stone, that, notwithstanding his great age, he resolved to submit to the operation of cutting. But his constancy was not put to this last proof; for a surgeon letting him blood, by way of precaution, pricked an artery, and, instead of endeavouring to stop the effusion of blood, ran away. There was but just time to call F. Commire, his friend and confessor, who came soon enough to see him die. This happened the 19th of October, 1691, in the 82^d year of his age.

BENSHEIM, a town of Germany in the Palatine of the Rhine, seated in E. Long. 8. 45. N. Lat. 52. 23.

BENSON (Dr George), a learned dissenting minister, born at Great Salkeld, in Cumberland, in 1699. His love of learning was so successful, that, at 11 years of age, he was able to read the Greek Testament. He afterwards studied at Dr Dixon's academy at Whitehaven, from whence he removed to the university of Glasgow. In 1721, he was chosen pastor of a congregation of dissenters at Abingdon, in Berkshire: in 1729, he received a call from a society of dissenters in Southwark, with whom he continued 11 years; and in 1740, was chosen, by the congregation of Crutched Friars, colleague to the learned and judicious Dr Lardner. From the time of his engaging in the ministry he proposed to himself the critical study of the Scriptures, particularly of the New Testament, as a principal part of his business. The first fruits of these studies which he presented to the public was, A defence of the reasonableness of prayer, with A translation of a dis-

course of Maximus Tyrius containing some popular objections against prayer, and An answer to these. The light which Mr Locke had thrown on the obscure parts of St Paul's epistles, by making him his own expositor, encouraged and determined Mr Benson to attempt to illustrate the remaining epistles in the same manner. In 1731, he published A paraphrase and notes on the epistle to Philemon, as a specimen. This was well received, and the author encouraged to proceed in his design. With the epistle to Philemon, was published "A short dissertation, to prove from the spirit and sentiments the apostle discovered in his epistles, that he was neither an enthusiast nor impostor; and consequently that the religion which he asserted he received immediately from heaven, and confirmed by a variety of miracles, is indeed divine." This argument hath since been improved and illustrated, with great delicacy and strength, in a review of the apostle's entire conduct and character, by lord Lyttleton. Mr Benson proceeded with great diligence and reputation to publish Paraphrases and notes on the two epistles to the Thessalonians, the first and second to Timothy, and the epistle to Titus; adding, Dissertations on several important subjects, particularly on inspiration. In the year 1735, our author published his History of the first planting of Christianity, taken from the acts of the apostles, and their epistles, in two vols 4to. In this work, besides illustrating throughout the history of the acts, and most of the epistles, by a view of the history of the times, the occasion of the several epistles, and the state of the churches to whom they were addressed, he established the truth of the Christian religion on a number of facts, the most public, important, and incontestable. He also wrote, The reasonableness of the Christian religion; The history of the life of Jesus Christ; A paraphrase and notes on the seven catholic epistles; and several other works which procured him great reputation. One of the universities in Scotland sent him a diploma with a doctor's degree; and many of high rank in the Church of England, as Herring, Hoadley, Butler, Benson, Coneybear, &c. shewed him great marks of favour and regard. He pursued the same studies with great application and success, till the time of his death, which happened in the year 1763, in the 64th year of his age.

BENTHAM (Thomas), bishop of Litchfield and Coventry, was born at Shruborn in Yorkshire, in the year 1513, and educated in Magdalen college, Oxford. He took the degree of bachelor of arts in 1543, and in 1546 was admitted perpetual fellow, and proceeded master of arts the year following, which was that of Edward VI.'s accession to the crown. He now threw off the mask of Popery, which, during the equivocal reign of Henry VIII. he had worn with reluctance. When Mary came to the crown, being deprived of his fellowship by her visitors, he prudently retired to Basil in Switzerland, where for some time he expounded the scriptures to the English exiles in that city; but, being solicited by some Protestants in London, he returned to London before the death of the queen, and was appointed superintendent of a private congregation in the city. Immediately on the accession of Elizabeth, Bentham was preferred in the church, and in the second year of her reign was consecrated bishop of Litchfield and Coventry. He died at Ecclethall in Staffordshire.

Bentivoglio, *snirc*, in 1578, aged 65. He was buried in the chancel of the church there; and a monument was erected, with the effigy of himself, his wife, and four children, with the following inscription:

*Hæc jacet in tumba Benthamus, episcopus ille
Doctus, divinus, largus, pascens, pius, almus.
Ob. 19 Feb. 1578.*

Bishop Bentham had the character of a pious and zealous reformer, and was particularly celebrated for his knowledge of the Hebrew language. His works are, 1. Exposition of the acts of the apostles; manuscript. 2. A sermon on Christ's temptation; Lond. 8vo. 3. Epistle to M. Parker; manuscript. 4. The Psalms, Ezekiel, and Daniel, translated into English, in queen Elizabeth's Bible.

BENTIVOGLIO (Guy), cardinal, born at Ferrara, in the year 1579. He went to study at Padua, where he made a considerable proficiency in polite literature. Upon his leaving the university, he went to reside at Rome, where he became universally esteemed. He was sent nuncio to Flanders, and then to France; in both which employments his behaviour was such as gave great satisfaction to Paul V. who made him a cardinal, which was the last promotion he made, a little before his death, which happened on the 28th of January 1621. Bentivoglio was at this time in France, where Lewis XIII. and all the French court congratulated him on his new dignity; and when he returned to Rome, his Christian majesty entrusted him with the management of the French affairs at that court. Pope Urban VII. had a high regard for him, on account of his fidelity, disinterestedness, and consummate knowledge in business. He was beloved by the people, and esteemed by the cardinals; and his qualities were such, that in all probability he would have been raised to the pontificate on the death of Urban, which happened on the 29th of July, 1644; but having gone to the conclave during the time of the most intolerable heats at Rome, it affected his body to such a degree, that he could not sleep for 11 nights afterwards; and this want of rest threw him into a fever, of which he died the 7th of September 1644, aged 65. He has left several works; the most remarkable of which are, A history of the civil wars of Flanders, An account of Flanders, with Letters and Memoirs.

BENTIVOGLIO, a small town of Italy in the territory of Bologna, with a castle, situated in E. Long. 11. 34. N. Lat. 44. 47.

BENTLEY (Richard), an eminent critic and divine, was the son of a mechanic tradesman at Wakefield in Yorkshire, where he was born in the year 1662, and probably received the first part of his education at the free-school in that town; whence being removed to St John's college in Cambridge, he followed his studies with indefatigable industry; and his inclination leading him strongly to critical learning, his skill and knowledge therein was taken notice of by Dr Edward Stillingfleet, who was bred at the same college, and in 1685 appointed him private tutor to his son. Mr Bentley had not been above a year in the Doctor's family, when he had compiled, in a thick volume in 4to, a kind of Hexapla; in the first volume of which was every word of the Bible alphabetically disposed; the various interpretations whereof from the Chaldee, Syriac, vulgar Latin, Septuagint, and the versions of Aquila,

Symmachus, and Theodosian, had their proper place in the other five volumes; besides another 4to volume of the various lections and emendations of the Hebrew text drawn out of those ancient versions. In 1692, his patron being advanced to the see of Worcester, collated him to a prebend in that church, and also made him his domestic chaplain. That learned prelate, as well as Dr Will. Lloyd, then bishop of Litchfield, had seen many proofs of our author's extraordinary merit, when they concurred in recommending him as a fit person to open the lectures upon Mr Boyle's foundation in defence of natural and revealed religion. This gave him a fine opportunity of establishing his fame. He saw it well; and resolved to push it to the utmost. Sir Isaac Newton's *Principia* had been published but a few years, and the book was little known and less understood: Mr Bentley therefore determined to spare no pains in displaying to the best advantage the profound demonstrations which that excellent work furnished in proof of a Deity; and that nothing might be wanting to complete the design, he applied to the author, and received from him the solution of some difficulties which had not fallen within the plan of his treatise *. In short, our author's sermons at Boyle's lectures were universally admired, and highly raised his reputation as a preacher; notwithstanding that escape which laid him open to the raillery of Dr Keil, *viz.* of proving the moon not to turn round her axis because she always shews the same face to the earth. In 1693, he was made keeper of the royal library at St James's; soon after which arose the famous dispute between him and the honourable Mr Boyle, in relation to the genuineness of the Epistles of Phalaris. In 1701 he was presented to the mastership of Trinity college, Cambridge, which is reckoned worth near 1000l. per annum. Upon this promotion he resigned his prebend of Worcester, and, in 1707, was collated to the archdeaconry of Ely; besides this, he was presented to a good benefice in that see. Being thus placed in a state of ease and affluence, he took his degree of doctor of divinity, entered into matrimony, and indulged his inclination in critical pursuits; and the fruits of his labours, which he occasionally published, all displayed such erudition and sagacity, that, by degrees, he obtained the character of being the greatest critic of the age. In the mean while, however, he carried matters with so high a hand in the government of his college, that, in 1709, a complaint was brought before the bishop of Ely, as visitor, against him, by several of the fellows, who charged him with embezzling the college money, and other misdemeanors. In answer to this, he presented his defence to the bishop, which he published in 1710, under the title of *The present State of Trinity College*, 8vo; and thus began a quarrel, which was carried on with the most virulent animosity on each side, for above 20 years, when it at last ended in the Doctor's favour. During the course of this dispute, he had been promoted to the regius professorship of divinity; and his majesty king George I. on a visit to the university in 1717, having, as usual, nominated by mandate several persons for a doctor's degree in that faculty, our professor, to whose office it belonged to perform the ceremony called *creation*, demanded four guineas from each person, besides a broad piece of gold, and absolutely refused to create any doctor without these fees: hence there arose a long

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* Vide
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and warm dispute, during which, the doctor was first suspended, and then degraded; but on a petition to his majesty for relief from that sentence, the affair was referred to the court of king's-bench, where the proceedings against him being reversed, a mandamus was issued, charging the university to restore him.—Dr Bentley was endued with a natural hardiness of temper, which enabled him to ride out both these storms without any extraordinary disturbance, or interruption to his literary pursuits. In his private character, tho' he is generally allowed to have been too fond of money, he was hearty, sincere, and warm in his friendship, an affectionate husband, and a most indulgent father. He loved hospitality and respect; maintained the dignity and munificence of the ancient abbots in house-keeping at his lodge, which he beautified; and, in conversation, tempered the severity of the critic with such a peculiar strain of vivacity and pleasantry, as was very entertaining. He died at his lodge in Trinity college, on the 14th of July, 1742, at 80 years of age. The Doctor's principal works, besides those already mentioned, were, 1. His animadversions and remarks on the poet Callimachus. 2. Remarks upon Collins's discourse of free-thinking. 3. Beautiful and correct editions of Horace, Terence, Phædrus, and Milton, with notes; but as the Doctor had not a poetic genius, many of his notes on our British poet, in which he has endeavoured to make emendations of the original, have been greatly and justly censured.

BENZOIN, in materia medica, a concrete resinous juice, obtained from a species of *laurus* *. The resin is brought from the East Indies in large masses, composed of white and light-brown pieces, with yellowish specks: it easily breaks betwixt the hands. That which is whitest is most esteemed. It has very little taste; but its smell is very fragrant and agreeable, especially when heated. The principal use of benzoin is in perfumes, and as a cosmetic; and enters in substance only into one official composition, the balsamum transtomicum. Its flowers, which is a white saline concrete obtained by committing it to the fire in proper vessels, are recommended in disorders of the breast †.

BERAMS, a coarse cloth, all made with cotton-thread, which comes from the East Indies, and particularly from Surat.

BERAR, a province of Asia, in the dominions of the Great Mogul, near the kingdom of Bengal. It abounds in corn, rice, pulse, and poppies, from which last they extract opium; and sugar-canes grow almost without cultivation. The capital town is called *Shampur*.

BERAUM, a royal city of Bohemia, and capital of a circle of the same name. E. Long. 14. 25. N. Lat. 50. 2.

BERAY, a town of Normandy in France, situated in W. Long. 1. 20. N. Lat. 49. 6.

BERBERIS, the *BARBERRY*, or *pipperidge bush*; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. 1. The vulgaris, or common barberry, grows naturally in hedges in many parts of England, as also in some parts of Scotland; but is also cultivated in gardens on account of its fruit, which is pickled, and used for garnishing dishes. It rises to the height of eight or ten feet, with many stalks, which have a

white bark, yellow on the inside: the stalks and branches are armed with sharp thorns, which commonly grow by threes; the leaves are oval, obtuse, and slightly fawed on their edges. The flowers come out from the wings of the leaves, in small ramose bunches, like those of the currant bush, and are of a yellow colour; these are succeeded by oval fruit, which are at first green, but when ripe turn to a fine red colour. The flowers appear in May, and the fruit ripens in September. There are two or three varieties of this shrub, which, by some, have been taken for distinct species: one is the barberry without stone; another, the barberry with white fruit; and a third is called by Tournfort *taller eastern barberry* with a black sweet fruit. Of these Mr Miller observes, that the first certainly depends on the age of the plant; because the suckers taken from those bushes commonly produce fruit with stones: the second, he says, seldom bears any fruit; the leaves are of a lighter green colour, and the bark of the stalks are whiter than those of the common kind: the third appears to be the same with the common sort, excepting the colour and flavour of its fruit, which can never indicate a specific difference. 2. The canadensis, is a native of that country from whence it takes its name, and was formerly much more common in British gardens than at present. The leaves are much broader and shorter than those of the common sort, and the fruit is black when ripe. 3. The cretica, with a single flower in each footstalk, is at present very rare in Britain; the plants being tender whilst young, and most of them killed by severe frost. This never rises more than three or four feet high in Britain; but sends out many stalks from the root, which are strongly armed with spines at every joint: the leaves are produced without order, and are shaped like those of the narrow leaved box-tree: the flowers come out from between the leaves, each having a slender footstalk; but they are not succeeded by fruit in Britain.

Culture. The first sort is generally propagated by suckers, which are sent out in great plenty from the root; but such plants are very apt to send out suckers in greater plenty than those that are propagated by layers; so the latter method is preferable. The best time for laying down the branches is in the autumn, when the leaves begin to fall: the young shoots of the same year are the best for this purpose; these will be well rooted by the next autumn, when they may be taken off, and planted where they are designed to remain. Where this plant is cultivated for its fruit, it should be planted single, not in hedges as was formerly the practice; the suckers should be every autumn taken away, and the gross shoots pruned out: by this means the fruit will be much fairer and in greater plenty than on those that are suffered to grow wild. The other sorts may be propagated in the same manner; only the third should be planted in pots, and sheltered as soon as the young shoots are taken off, till the plants have acquired strength; when they may be turned out, and planted in a warm situation.

Medicinal and other qualities. The berries, which are so acid that birds will not feed upon them, are moderately astringent; and have been given with success in bilious fluxes, and diseases proceeding from heat, acrimony, and thinness of the juices. Among the Egyptians barberries are used in fluxes and in malignant fevers,

Barberis.

Berberis
|
Berengarianism.

fevers, for abating heat, quenching thirst, raising the strength, and preventing putrefaction: the fruit is macerated for a day and a night, in about 12 times its quantity of water, with the addition of a little fennel-seed, or the like, to prevent offence to the stomach; the liquor strained off, and sweetened with sugar or syrup of citrons, is given the patient liberally to drink. Prosper Alpinus, from whose treatise *de medicina Ægyptorum* Dr Lewis extracted this account, informs us, that he took this medicine himself with happy success, in a pestilential fever accompanied with an immoderate bilious diarrhoea. The leaves also are gratefully acid. The flowers are offensive to the smell when near, but at a distance their odour is extremely fine. An infusion of the bark in white-wine is purgative. The roots boiled in ley dye wool yellow. In Poland they dye leather of a most beautiful yellow with the bark of the root. The inner bark of the stems dyes linen of a fine yellow with the assistance of alum. This shrub should never be permitted to grow in corn lands; for the ears of wheat that grow near it never fill, and its influence in this respect has been known to extend across a field of 300 or 400 yards. Cows, sheep, and goats, eat it; horses and swine refuse.

BERBICE, a river of Terra Firma in America, which falls into the North Sea, in S. Lat. 6. 30. This is the only river in the country, and waters a great number of plantations of cotton, &c. belonging to the Dutch.

BERCHEROIT, or BERKOITS, a weight used at Archangel, and in all the Russian dominions, to weigh such merchandizes as are heavy and bulky: it weighs about 364 lib. English avoirdupois weight.

BERCHETT (Peter), an eminent history-painter, was born in France in 1659, and at the age of 18 was employed in the royal palaces. He came to England in 1681, to work under Rameau, a French painter & of architecture; but, after staying a year, returned to Marli. He came again, and was sent by king William to the palace he was building at Loo, where he was employed 15 months; and then came a third time to England, where he had sufficient business. We are informed by Mr Walpole, that he then painted the ceiling of the chapel of Trinity college, Oxford, the staircase at the duke of Schomberg's in Pall-Mall, and the summer-house at Ranelagh. His drawings in the academy were much approved. Towards the close of his life he retired to Marybone, where he painted only small pieces of fabulous history, and died there in January 1720.

BERECYNTHIA; the mother of the gods, in the Pagan theology.

BERENGARIANISM, a name given by ecclesiastical writers to the opinion of those who deny the truth and reality of the body and blood of Christ in the eucharist. The denomination took its rise from Berengarius, archdeacon and scholasticus of the church of St Mary at Anjou about the year 1035, who maintained, that the bread and wine, even after consecration, do not become the true body and blood of our Lord, but only a figure and sign thereof.

Berengarianism was strenuously opposed by Lanfranc, Guilmund, Adelmunnus, Albericus, &c. Divers synods were held, wherein the author was condemned at Rome, Versailles, Florence, Tours, &c. He retracted,

and returned again more than once; signed three several catholic confessions of faith, the first in the second council of Rome, the second in the third, and the third in the fourth council of the same city. But he still relapsed to his former opinion when the storm was over; though Mabillon maintains he soon recovered from his fourth fall, and died an orthodox catholic in 1088.

BERENICE, daughter of Ptolemy Auletes king of Egypt, succeeded her father before his death. This banished prince implored the assistance of the Romans. Pompey restored him. Berenice, to support herself on the throne, allured a prince, whose name was Seleucus, descended from the kings of Syria, and admitted him to her nuptial bed, and to her sceptre. She was soon weary of him, and put him to death. She next cast her eye on Archelaus, who married her, and put himself at the head of her troops to repulse the Romans. He was killed in a battle. Ptolemy returned to Alexandria, and put his rebellious daughter to death.

BERENICE, wife of Ptolemy Evergetes king of Egypt, cut off her hair in pursuance of a vow, and consecrated it in the temple of Venus. This deposit being afterward lost, Conon the mathematician, in compliment to her, declared that the queen's locks had been conveyed to heaven, and composed those seven stars near the tail of the bull, called to this day *coma Berenices*.

BERENICE, daughter of Costobarus and of Salome sister to Herod the Great, was married first to Aristobulus, son of the same Herod and Mariamne. He having a brother who married the daughter of Archelaus king of Cappadocia, often upbraided Berenice that he was married below himself in wedding her. Berenice related all these discourses to her mother, and exasperated her so furiously, that Salome, who had much power over Herod's mind, made him suspect Aristobulus, and was the principal cause that urged this cruel father to get rid of him. She married again; and having lost her second husband, went to Rome, and got into the favour of Augustus. But, above all, she insinuated herself into the good graces of Antonia, the wife of Drusus, which in the end proved of great service to Agrippa.

BERENICE, grand-daughter of the preceding, and daughter of Agrippa I. king of Judæa, has been much talked of on account of her amours. She was betrothed to one Marcus, but he died before the marriage. Soon after, she married his uncle Herod, who at the desire of Agrippa both his brother and father-in-law, was created king of Chalcis by the emperor Claudius. She lost her husband in the 8th year of the emperor Claudius; and in her widowhood, it was rumoured, she committed incest with her brother Agrippa. To put a stop to this report, she offered herself in marriage to Polemon king of Cilicia, provided he would change his religion. He accepted her offers, was circumcised, and married her. Berenice soon left him to follow her own ways, and he abandoned Judaism to return to his former religion. She was always very well with her brother Agrippa, and seconded him in the design of preventing the desolation of the Jews. She got Titus into her snares; but the murmurs of the Roman people hindering her from becoming his wife, there remained nothing for her but the title of mistress or concubine of the

e the emperor. The French stage, in the 17th century, reformed with the amours of Titus and Berenice.

BERENICE, (anc. geog.), the name of several cities, particularly of a celebrated port-town on the Sinus Arabicus, now *Suez*; which see.

BERENICE'S HAIR, *Coma Berenices*. See BERENICE.

BERE-REGIS, a town in Dorsetshire in England, in W. Long. 2. 15. N. Lat. 50. 40.

BERESOW, a division of the province of Tobolsk in Siberia. It is bounded on the north by the straits of Waigatz, on the east by a large bay of the frozen ocean which runs into the land towards the south, and at the 65th degree of latitude separates into two arms; one of which is called the *Obkaia-Guba*, or *Oby-bay*; and the other *Tazovskaia-Guba*, or the bay of *Tazov*. The river Oby empties itself into the former, and the Taz into the latter. This district was under the Russian dominion long before the other parts of Siberia were conquered, being reduced by the Czar Gabriel so early as the year 1530.

BERG, a duchy of Germany, in the circle of Westphalia. It is bounded on the north by the duchy of Cleves, on the west by the county of Mark and the duchy of Westphalia, on the south by Wetteravia, and on the east by the diocese of Cologne, from which it is separated by the Rhine. It is about 150 miles in length, and 24 in breadth. It is very fruitful along the Rhine, but mountainous and woody towards the county of Mark. It is subject to the elector Palatine, but his right is disputed by Prussia and Saxony. The principal town is Dusseldorf; and the principal rivers, besides the Rhine, are the Wipper, Agger, and Sieg.

BERG (St Winox), a town of the Low Countries, in the country of Flanders, fortified by Vauban, and subject to France. It is seated on the river Colme, six miles from Dunkirk, and 21 from Ypres. The air is often very unwholesome, especially to strangers. It has an hospital for soldiers, taken care of by friars called *Boni Fieus*, and two seminaries for young students. The river Colme serves instead of a canal to go to Hondshote, St Omer's, and Gravelines. There is likewise another canal to go to Dunkirk. The villages in its territory are very famous for butter and cheese, of which they send a great quantity to Flanders. Fort Lapin and Fort Suille are within a cannon's shot of this place, and Fort St Francis is seated on the canal, near three miles from the town. E. Long. 2. 35. N. Lat. 50. 57.

BERG-ZABERN, a town of France, in Alsace. E. Long. 7. 55. N. Lat. 49. 4.

BERG-Gruin, in natural history, the name of an earth used in painting, and properly called *green okre*, tho' not known among the colour-men under that name. It is found in many parts of Germany, Italy, and England, commonly in the neighbourhood of copper-mines, from particles of which metal it receives its colour. In many parts of Germany, they have a purer kind of this, distinguished by no peculiar name, but separated by art from the waters draining from the copper-mines, and differing no otherwise from this native substance, than as the washed okres of Oxfordshire, &c. do from these sent us in their natural condition. The characters by which the native kind is known from other green earths, are these: it is a dense compact substance, considerably heavy, and of a pale but not disagreeable

green; of a rough and uneven, but not dusty surface, and somewhat unctuous to the touch. It adheres firmly to the tongue; does not break easily between the fingers; nor at all stains the hands. It is of a brackish disagreeable taste, and does not ferment with acids.

BERGAMASCO, a province of Italy, in the territory of Venice. It is bounded on the east by the Bressan, on the north by the Valteline, on the west and south by the Milanese. It extends about 36 leagues from north to south, and 30 from east to west. It is watered by several rivers which render it very fertile, and particularly it produces a great number of chestnuts. It has mines of iron, and quarries of marble, and other stones of which they make millstones. There are a great number of villages, but no city except Bergamo the capital. The people are very industrious, and make the best of their natural productions. They are well stocked with cattle, and make fine tapestry. Their language is the most corrupt of any in Italy.

BERGAMO (James Philip de), an Augustin monk, born at Bergamo in 1434, wrote in Latin a Chronicle from the creation of the world to the year 1503, and a Treatise of Illustrious Women. He died in 1518.

BERGAMO, anciently *Bergomum*, a large and strong town of Italy, in the Venetian territory, and capital of the province of Bergamasco. It has a strong citadel, and is the see of a bishop. Its situation near the Alps makes the inhabitants subject to swellings in their throats, owing to the badness of the Alpine waters. E. Long. 9. 38. N. Lat. 45. 42.

BERGAMOT, a species of citron, produced at first casually by an Italian's grafting a citron on the stock of a bergamot pear-tree, whence the fruit produced by this union participated both of the citron-tree and the pear-tree. The fruit hath a fine taste and smell, and its essential oil is in high esteem as a perfume. The essence of Bergamot is also called *essentia de cedra*. It is extracted from the yellow rind of the fruit by first cutting it in small pieces, then immediately squeezing the oil out of them into a glass vessel. This liquor is an ethereal oil. A water is distilled from the peel as follows: Take the outer rind of three bergamots, a gallon of pure proof spirit, and four pints of pure water; draw off a gallon in a balneum marie, then add as much of the best white sugar as will be agreeable. Or, take of the essence of bergamot three drams and a half, of rectified spirit of wine three pints, of volatile sal ammoniac a dram; distil off three pints in a balneum marie.

BERGARAC, a very rich, populous, and trading town of France, seated on the river Dordogne, in E. Long. 0. 37. N. Lat. 50. 57.

BERGAS, a town of Romania in European Turkey, and the sec of a Greek archbishop. It is seated on the river Larissa, in E. Long. 27. 30. N. Lat. 41. 17.

BERGEN, anciently *Bergi*, a city of Norway, and capital of the province of Bergenhus. It is the see of a bishop, and has a strong castle and a good port. It is a large place; but subject to fires, as being all built of wood. It is surrounded with mountains almost inaccessible; and little or no corn grows in all the country: that which they use is all imported, and distributed from thence throughout the kingdom. The principal trade is in stock-fish, firs, and deal-boards. E. Long. 5. 45. N. Lat. 60. 11.

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BERGEN, a town of Pomerania in Germany, and capital of the life of Rugen, subject to the Swedes. E. Long. 13. o. N. Lat. 54. 30.

BERGEN-OP-ZOOM, a town of the Low Countries, in Dutch Brabant, and in the marquise of the same name. It is seated on an eminence, in the middle of a morass, about a mile and a half from the eastern branch of the Scheld, with which it has a communication by a navigable canal. The houses are well built, and the market-places and squares handsome and spacious. The church, before the last siege, was reckoned a good building, and so was the marquis's palace. It has a good tract of land under its jurisdiction, with several villages, and some islands in the Scheld. It has a very advantageous situation on the confines of Brabant, Holland, Zealand, and Flanders. It is strong by nature as well as by art, being so secured by the morasses about it, which are formed by the river Zoom, that it was reckoned impregnable. It was, however, taken in 1747 by the French, but it is thought not without the help of treachery. The fortifications are allowed to be the master-piece of that great engineer Cohorn. It had been twice besieged before, without success. The marquis of Spinola was the last but one who invested it, and he was forced to raise the siege with the loss of 10,000 men. E. Long. 4. 15. N. Lat. 51. 30.

BERGHEM (Nicholas), a Dutch painter and engraver, had a genius truly pastoral. The simplicity of Arcadian manners is no where better described than in his works. We have a large collection of prints from his designs; many etched by himself, and many by other masters. Those by himself are slight but masterly. His execution is inimitable. His cattle, which are always the distinguishing part of his pieces, are well drawn, admirably characterized, and generally well grouped. Few painters excelled more in composition than Berghem; and yet we have more beautiful instances of it in the prints etched by others, than in those by himself. Among his own etchings a few small plates of sheep and goats are exceedingly valued.—He died in 1683.

BERGHMONT, an assembly or court held upon a hill in Derbyshire, for deciding controversies among the miners.

BERIA, **BERIE**, *Berry*, signifies a large open field; and those cities and towns in England which end with that word are built on plain and open places, and do not derive their names from boroughs, as Sir Henry Spelman imagines. Most of our glossographers in the names of places have confounded the word *berie* with that of *bury* and *borough*, as if the appellative of ancient towns: whereas the true sense of the word *berie* is a flat wide campaign, as is proved from sufficient authorities by the learned Du Fresnoie, who observes that *Beria Sancti Edmundi*, mentioned by Mat. Paris. fub. ann. 1174. is not to be taken for the town, but for the adjoining plain. To this may be added, that many flat and wide meads, and other open grounds, are called by the name of *beries* and *beriefields*: the spacious meadow between Oxford and Ilpay was in the reign of king Athelstan called *Bery*; as is now the largest pasture ground in Quarendon in the county of Buckingham, known by the name of *Beryfield*. And though these meads have been interpreted demefne or manor meadows, yet they were truly any flat or open meadows that lay adjoining

to any villa or farm.

BERING (Sinius), of Copenhagen, a Latin lyric poet, flourished about 1560.

BERKELEY (George), the celebrated bishop of Cloyne, was the son of a clergyman in Ireland, distinguished only by his piety and learning. He was educated at Trinity college in Dublin, of which he attained a fellowship. His first essays as a writer were published in the Spectator and Guardian, which entertaining works he adorned with many pieces in favour of virtue and religion. His learning and virtues, his wit and agreeable conversation, introduced him to the acquaintance, and procured him the esteem and friendship, of many great and learned men; and among others the earl of Peterborough, Dr Swift, and Mr Pope. The earl made him his chaplain, and took him as his companion on a tour through Europe.

He was promoted to the deanery of Clogher after his return; and in this situation, formed a most benevolent and charitable plan for the better supplying of the churches in our foreign plantations, and converting the savage Americans to christianity, by erecting a college in the Summer islands. The proposal was well received; and he obtained a charter for the foundation, with a parliamentary grant of 20,000 l. toward carrying it into execution: but he could never get the money; so that, after two years stay in America on this business, the design dropped.

He was warmly engaged too, in concert with Swift, Bolingbroke, and others, in a scheme for establishing a society for the improvement of the English language, in imitation of the academy of France. But Harley, the great patron of it, falling from power, this design too proved abortive.

In the year 1734, he was advanced from the deanery of Derry to the bishoprick of Cloyne, where he distinguished himself by pastoral vigilance and constant residence; and at once endeared himself to his people, by promoting their temporal and spiritual happiness. He endeavored by all means to raise a spirit of industry, and propagate the arts of cultivation and agriculture in that neglected country.

The earl of Chesterfield, when he was lord lieutenant of Ireland, offered him a richer see; but he declined it, saying, his neighbours and he loved one another, and he could not think of forming new connections in his old days, and tearing himself from those friends whose kindness to him was his greatest happiness. Finding the infirmities of age come upon him, and that he was unable to discharge the functions of his office, he retired to Oxford, there to spend the remainder of his days in conversation with learned men, and to superintend the education of his son. And that the revenues of the church might not be misapplied, nor the interests of religion suffer by his absence from his diocese, he made great interest for leave to resign his bishoprick, and to obtain in lieu of it a canonry of Christ-church. But soon after his arrival in Oxford he died very suddenly and without a groan, January 14. 1753, in the 73^d year of his age. His remains were interred at Christ-Church, Oxford; where there is a handsome monastery erected to his memory, with an inscription drawn up by Dr Markham, in Latin. Dr Watkinson says he was particularly fond of music, and that he always kept one or two exquisite per-

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performers to amuse his leisure hours. Mr Pope sums up his character in one line. After he has mentioned some particular virtues that characterize other prelates, he ascribes

To Berkley ev'ry virtue under heav'n.

He published many ingenious works, particularly *The Principles of Human Knowledge*, the singular notions in which gave rise to much controversy: A new theory of vision: Alciphron, or the minute philosopher; one of the most elegant and genteel defences of that religion which he was born to vindicate both by his virtues and his ingenuity: and *Siris*, or a Treatise on tar water, which, under his sanction, became for a while a very popular medicine.

BERKSHIRE, an inland county of England, in the diocese of Salisbury, divided on the north and north-east by the Thames from Oxfordshire and Buckinghamshire, on the west it is bounded by Gloucestershire and Wiltshire, on the south-east by Surrey, and on the south by Hampshire. It is 120 miles in circumference, and contains about 527,000 acres. The air is sweet, and soil fruitful. It has plenty of corn, cattle, wild-fowl, wool, and timber, especially oak and beech. The rivers are the Thames, Kennet, Ocke, Loddon, and Lambourn. The Kennet is now made navigable by act of parliament. This county sends nine members to parliament, has 140 parishes, and 12 market towns. The principal towns are Reading, Abingdon, Windsor, Wallingford, Maidenhead, Hungerford, Newbury, Farringdon, Wantage, Lower Lambourn, East Ilshy, and Oakingham. The royal palace and castle at Windsor, built by Edward III. are remarkable for their fine situation, rich furniture, paintings, and many other curiosities. In St George's chapel are held the chapters of the order of the garter instituted by the above king Edward III. A few miles to the south-east of this town is the figure of a white horse, covering an acre of ground, cut in a hill of chalk, from whence it may be seen at a great distance, and is said to have been made by direction of king Alfred, in memory of a great victory he obtained. The neighbouring people have from time immemorial a kind of festival, called *scouring the horse*, when they cleanse it of weeds, whereby the chalky bottom still preserves a fine effect at a considerable distance.—Near Reading is a natural curiosity, thought to have remained ever since the flood. It is a bed of oyster shells and sand, 30 or 40 feet under the surface of a hill, and covered with different strata. These shells retain the true figure and colour, but moulder with a small pressure. In this county are also remains of Roman antiquities and fortifications, with some of the famous causeway called *Icknild-street*.

BERLIN, a city of Germany, capital of the electorate of Brandenburg, and of the whole Prussian dominions, seated in E. Long. 13. 37. N. Lat. 52. 53. This city is one of the largest, best built, and best governed, of any in Germany. The streets are large, straight, clean, and well paved, and some of them very long and elegant. There are also several large and beautiful squares, with pleasant walks. It is surrounded with handsome gardens, which produce excellent fruit. The river Spree, that crosses the city, has a communication with the Havel, Oder, and Elbe, which greatly facilitate commerce. The French refugees

have greatly contributed to the embellishment of the grandeur of Berlin; inasmuch as they have introduced all kinds of manufactures, and various arts.

Berlin is divided into five parts, without reckoning the suburbs, which are very large. The houses in these last are almost all of wood; but so well plastered, that they seem to be of stone. In the suburb called *Spandau* is a house belonging to the royal family, with well contrived apartments, and furnished in a very fine taste. In the suburb of *Stralau* is a house and garden belonging to the king. The royal gate of the city is defended by a half moon, and two bastions, covered with brick; it fronts the royal street, which is one of the longest and most frequented in the city. It contains very handsome houses, particularly those belonging to some of the ministers of state.

The royal street is crossed by five others, which are large and fine. On the new bridge, which is of stone, over the Spree, is an equestrian statue of William the Great, which is esteemed an exquisite piece of workmanship. The elector is represented in a Roman habit, and his horse stands on a pedestal of white marble adorned with bas-reliefs, and four slaves bound to the base.

After this bridge is past, the king's palace appears, which is a grand and superb edifice; it is four stories high, and the apartments are extremely magnificent. No place in Europe has such a great quantity of silver tables, stands, lustres, branched candlesticks, &c. In the knights hall there is a buffet, which takes up all one side, where there are basins and cisterns of gilt silver, of an extraordinary magnitude. The furniture of the great apartment is extremely rich; and there is a very handsome gallery, adorned with paintings, representing the principal actions of Frederic I. Formerly there were fine gardens to the palace, but they are now turned into a place for arms. The king's stables are large, stand near the palace, and front the great street. Externally they make a Gothic appearance, but within they are very magnificent. The mangers are of stone, and the pillars that divide the stalls are of iron, adorned with the king's cypher, gilt. Over the racks are pictures representing the finest horses which the king's stud has produced. Over the stables there are large rooms, containing all sorts of horse furniture, particularly the horse-equipage of Frederic I. all the metallic part of which is gold, set with diamonds. Besides these, there are handsome lodgings for the officers of the stables. Over the riding house is a theatre, where plays have been acted, and balls have been made for the entertainment of the court.

The arsenal consists of four grand buildings, that form a court in the middle, like a college: each front has three large portico's. On the principal gate is a medallion of the late king, in bronze; and the four cardinal virtues, of a colossal stature, placed on pedestals on each side of the portico, seem to look at the portrait of the king, which is supported by Fame and Victory. The Corinthian order is prevalent in the first stage, and is managed with a great deal of art. The whole edifice is surrounded in the upper part with a balustrade, adorned with trophies and statues, among which is Mars seated on a heap of several sorts of arms. This altogether forms a noble and majestic decoration.

Berlin.

It is bounded with iron in the shape of cannon, which are placed at proper distances, and support iron chains, that hang like fetters, to prevent passengers from approaching the windows below. The lower rooms are filled with a great number of brass cannon; the walls and pillars which sustain the floor are set off with cuirasses and helmets. The upper story contains several rooms filled with arms, which are disposed in a curious order. Behind the arsenal is the house of the general of the artillery, which includes the foundry, where they are continually at work. Besides these there are other places where they keep the train of artillery.

The opera-house is an elegant modern edifice. The front has a noble portico supported by Corinthian columns, and a pediment adorned with basso relievos and statues. The columns that support the roof throw the whole into a grand faloon. It has three galleries, and is said to be capable of containing 2000 persons.

A rampart and fosse separate Worden from Dorothea Stadt, or the New Town, inhabited chiefly by French. There are seven great alleys or walks, which divide this quarter into two parts. The middle walk is broader than the rest, and is surrounded with ballustrades, having a grass-plot in the middle; this is for persons that take the air on foot. The alleys on each side are paved, and serve for those that come abroad in coaches. These alleys, which are about three miles in length, are terminated with a bar, that leads towards the park. The alleys with trees are bounded by rows of houses. In one of these is a building, formerly called the *lesfer stables*, and now made into lodgings for the guards. The apartments above these are occupied by the academy of painting and the academy of arts and sciences. Behind these is the observatory, where there is a great number of astronomical and mathematical instruments.

There are other things worthy of observation, such as the cabinet of medals, and of the antiquities belonging to the king; that of natural curiosities; the chemical laboratory, and its furnaces and medals, of a new invention; the theatre for anatomical demonstrations; the royal library, which is one of the completest in Germany, and has many scarce books and manuscripts.

The city was taken in 1760 by an army of Russians, Austrians, Saxons, &c. who entered on the 9th of October. They totally destroyed the magazines, arsenals, and foundries, seized an immense quantity of military stores, and a number of canon and arms; called first for the immediate payment of 800,000 guilders, and then laid on a contribution of 1,900,000 German crowns: not satisfied with this, many irregularities were committed by the soldiery; but on the whole, though some shocking actions were committed, a far more exact discipline was observed than from such troops could have been expected upon such an occasion, where there was every incentive which could work upon the licence of a conquering army. Their officers no doubt with great difficulty preserved even that degree of order.

But though their behaviour was tolerable with regard to the private inhabitants, there was something shocking and ungenerous in their treatment of the king's palaces. The apartments of the royal castle of Charlottenburg were entirely plundered, the precious furniture spoiled, the pictures defaced, without even

sparing the antique statues collected by cardinal Polignac, which had been purchased by the house of Brandenburg. The cattle of Schonhausen, belonging to the queen, and that of Fredericsfeld, belonging to the Margrave Charles, were also plundered.

The palace of Potsdam, the famous Sans-souci, had a better fate; Prince Esterhazy commanded there, and it was preserved from the smallest violation. The prince, on viewing the palace, only asked which picture of the king resembled him most; and being informed, desired that he might have leave to take it, together with two German flutes which the king used, to keep them, he said, in memory of his majesty. This was a sort of taking very different from pillage.

They staid in the city four days: but hearing that the king, apprehensive of this stroke, was moving to the relief of his capital, they quitted it on the 13th of October; and having wasted the whole country round for a vast extent, and driven away all the cattle and horses they could find, retreated by different routes out of Brandenburg.

BERME, in fortification, a space of ground left at the foot of the rampart, on the side next the country, designed to receive the ruins of the rampart, and prevent their filling up the fosse. It is sometimes palisadoed, for the more security; and in Holland it is generally planted with a quick-set hedge. It is also called *liziere*, *relais*, *foreland*, *retraite*, *pais de fouris*, &c.

BERMUDAS, or SUMMER-ISLANDS, a cluster of small islands in the Atlantic ocean, lying almost in the form of a shepherd's crook, in W. Long. 65. N. Lat. 32. 30: between 200 and 300 leagues distant from the nearest place of the continent of America, or any of the other West-India islands. The whole number of the Bermudas islands is said to be about 400, but very few of them are habitable. The principal is St George's, which is not above 16 miles long, and three at most in breadth. It is universally agreed, that the nature of this and the other Bermudas islands has undergone a surprising alteration for the worse since they were first discovered; the air being much more inclement, and the soil much more barren, than formerly. This is ascribed to the cutting down those fine spreading cedar-trees for which the islands were famous, and which sheltered them from the blasts of the north-wind, at the same time that it protected the undergrowth of the delicate plants and herbs. In short, the Summer-islands are now far from being desirable spots; and their natural productions are but just sufficient for the support of the inhabitants, who, chiefly for that reason, perhaps, are temperate and lively even to a proverb: at first tobacco was raised upon these islands; but being of a worse quality than that growing on the continent, the trade is now almost at an end. Large quantities of ambergris were also originally found upon the coasts, and afforded a valuable commerce; but that trade is also reduced, as likewise their whale trade, tho' the perquisites upon the latter form part of the governor's revenue, he having L. 10 for every whale that is caught. The Bermudas islands, however, might still produce some valuable commodities, were they properly cultivated. There is here found, about three or four feet below the surface, a white chalk stone which is easily chiseled, and is exported for building gentlemen's houses in the West-Indies. Their palmetto leaves, if properly man-

nufactured, might turn to excellent account in making womens hats; and their oranges are still valuable. Their soil is also said to be excellent for the cultivation of vines, and it has been thought that silk and cochineal might be produced; but none of these things have yet been attempted. The chief resource of the inhabitants for subsistence is in the remains of their cedar-wood, of which they fabricate small sloops, with the assistance of the New England pine, and sell many of them to the American colonies, where they are much admired. Their turtle-catching trade is also of service; and they are still able to rear great variety of tame-fowl, and have wild ones abounding in vast plenty. All the attempts to establish a regular whale-fishery on these islands have hitherto proved unsuccessful; they have no cattle, and even the black hog breed, which was probably left by the Spaniards, is greatly decreased. The water on the islands, except that which falls from the clouds, is brackish; and at present the same diseases reign there as in the Caribbee islands. They have seldom any snow, or even much rain; but when it does fall, it is generally with great violence, and the north or north-east wind renders the air very cold. The storms generally come with the new moon; and if there is a halo or circle about it, it is a sure sign of a tempest, which is generally attended with dreadful thunder and lightning. The inhabited parts of the Bermudas islands are divided into nine districts called *tribes*. 1. St George. 2. Hamilton. 3. Ireland. 4. Devonshire. 5. Pembroke. 6. Pagets. 7. Warwick. 8. Southampton. 9. Sandys. There are but two places on the large island where a ship can safely come near the shore, and these are so well covered with high rocks that few will choose to enter in without a pilot; and they are so well defended by forts, that they have no occasion to dread an enemy. St George's town is at the bottom of the principal haven; and is defended by nine forts, on which are mounted 70 pieces of cannon that command the entrance. The town has a handsome church, a fine library, and a noble town-house, where the governor, council, &c. assemble. Besides these there are about 1000 houses well built. The tribes of Southampton and Devonshire have each a parish-church and library, and the former has a harbour of the same name; and there are also scattered houses and hamlets over many of the islands, where particular plantations require them. The inhabitants are clothed chiefly with British manufactures, and all their implements for tilling the ground and building are made in Britain.

It is uncertain who were the first discoverers of the Bermudas islands. John Bermudas a Spaniard is commonly said to have discovered them in 1527; but this is disputed, and the discovery attributed to Henry May an Englishman. As the islands were without the reach of the Indian navigation, the Bermudas were absolutely uninhabited when first discovered by the Europeans. May above-mentioned was shipwrecked upon St George's; and with the cedar which they felled there, assisted by the wreck of their own ship, he and his companions built another which carried them to Europe, where they published their accounts of the islands. When lord Delawar was governor of Virginia, Sir Thomas Gates, Sir George Summers, and captain Newport, were appointed to be his deputy governors; but their ship being separated by a storm from

the rest of the squadron, was in the year 1609 wrecked on the Bermudas, and the governors disagreeing among themselves, built each of them a new ship of the cedar they found there, in which they severally sailed to Virginia. On their arrival there, the colony was in such distress, that the lord Delawar, upon the report which his deputy-governors made him of the plenty they found at the Bermudas, dispatched Sir George Summers to bring provisions from thence to Virginia in the same ship which brought him from Bermudas, and which had not an ounce of iron about it, except one bolt in the keel. Sir George, after a tedious voyage, at last reached the place of his destination, where, soon after his arrival, he died, leaving his name to the islands, and his orders to the crew to return with black hogs to the colony of Virginia. This part of his will, however, the sailors did not chuse to execute; but setting sail in their cedar ship for England, landed safely at Whitechurch in Dorsetshire.

Notwithstanding of this dereliction of the island, however, it was not without English inhabitants. Two sailors, Carter and Waters, being apprehensive of punishment for their crimes, had secreted themselves from their fellows when Sir George was wrecked upon the island, and had ever since lived upon the natural productions of the soil. Upon the second arrival of Sir George they enticed one Chard to remain with them; but differing about the sovereignty of the island, Chard and Waters were on the point of cutting one another's throats, when they were prevented by the prudence of Carter. Soon after, they had the good fortune to find a great piece of ambergris weighing about 80 pounds, besides other pieces, which in those days were sufficient, if properly disposed of, to have made each of them master of a large estate. Where they were, this ambergris was useless; and therefore they came to the desperate resolution of carrying themselves and it in an open boat to Virginia or to Newfoundland, where they hoped to dispose of their treasure to advantage. In the mean time, however, the Virginia company claimed the property of the Bermudas islands; and accordingly sold it to 120 persons of their own society, who obtained a charter from king James for their possessing it. This new Bermudas company, as it was called, fitted out a ship with 60 planters on board to settle on the Bermudas, under the command of one Mr Richard Moor, by profession a carpenter. The new colony arrived upon the island just at the time the three sailors were about to depart with their ambergris; which Moor having discovered, he immediately seized and disposed of it for the benefit of the company. So valuable a booty gave vast spirit to the new company; and the adventurers settled themselves upon St George's island, where they raised cabins. As to Mr Moor, he was indefatigable in his duty, and carried on the fortifying and planting the island with incredible diligence; for we are told, that he not only built eight or nine forts or rather blockhouses, but inured the settlers to martial discipline. Before the first year of his government was expired, Mr Moor received a supply of provisions and planters from England; and he planned out the town of St George as it now stands. The fame of this settlement soon awakened the jealousy of the Spaniards, who appeared off St George's with some vessels; but being fired upon from the forts, they

Bermudas.

they sliced off, tho' the English at that time were so ill provided for a defence, that they had scarce a single barrel of gun-powder on the island. During Moor's government the Bermudas were plagued with rats which had been imported into them by the English ships. This vermin multiplied so fast in St George's island, that they even covered the ground, and had nests in the trees. They destroyed all the fruits and corn within doors; nay, they increased to such a degree, that St George's island was at last unable to maintain them, and they swam over to the neighbouring islands, where they made as great havoc. This calamity lasted five years, tho' probably not in the same degree, and at last it ceased all of a sudden.

On the expiration of Moor's government, he was succeeded by captain Daniel Tucker, who improved all his predecessor's schemes for the benefit of the island, and particularly encouraged the culture of tobacco. Being a severe disciplinarian, he held all under him so rigidly to duty, that five of his subject planned as bold an enterprize for liberty as was perhaps ever put in execution. Their names were Barker, who is said to have been a gentleman; another Barker, a joiner; Goodwin, a ship-carpenter; Paet, a sailor; and Saunders, who planned the enterprize. Their management was as artful as their design was bold. Understanding that the governor was deterred from taking the pleasure of fishing in an open boat, on account of the dangers attending it, they proposed to build him one of a particular construction, which accordingly they did in a secret part of the island; but when the governor came to view his boat, he understood that the builders had put to sea in it. The intelligence was true: for the adventurers, having provided themselves with the few necessities they wanted, sailed for England; and notwithstanding the storms they encountered, their being plundered by a French privateer, and the incredible miseries they underwent, they landed in 42 days time at Corke in Ireland, where they were generously relieved and entertained by the earl of Thomond.

In 1619, captain Tucker resigned his government to captain Butler. By this time the high character which the Summer islands bore in England, rendered it fashionable for men of the highest rank to encourage their settlement; and several of the first nobility of England had purchased plantations among them. Captain Butler brought over with him 500 passengers, who became planters on the islands, and raised a monument to the memory of Sir George Summers. The island was now so populous, (for it contained about a thousand whites), that captain Butler applied himself to give it a new constitution of government by introducing an assembly, the government till this time being administered only in the name of the governor and council. A body of laws was likewise drawn up, as agreeable to the laws of England as the situation of the island would admit of. One Mr Barnard succeeded captain Butler as governor, but died six weeks after his arrival on the island; upon which the council made choice of Mr Harrison to be governor, till a new one should be appointed. No fewer than 3000 English were now settled in the Bermudas, and several persons of distinction had curiosity enough to visit it from England. Among these was Mr Waller, the poet, a man of fortune, who being embroiled with the parliament and

commonwealth of England, spent some months in the Summer islands, which he has celebrated in one of his poems as the most delightful place in the world. The dangers attending the navigation, and the untowardly situation of these islands, through their distance from the American continent, seem to be the reasons why the Bermudas did not now become the best peopled islands belonging to England; as we are told that some time ago they were inhabited by no fewer than ten thousand whites. The inhabitants, however, never showed any great spirit for commerce, and thus they never could become rich. This, together with the gradual alteration of the soil and climate already taken notice of, soon caused them dwindle in their population; and it is computed that they do not now contain above half the number of inhabitants they once did, and even these seem much more inclined to remove to some other place than to stay where they are; so that, unless some beneficial branch of commerce be found out, or some useful manufacture established, the state of the Bermudas must daily grow worse and worse.

BERN, one of the cantons of Switzerland, which holds the second rank among the 13; but as it is by far the largest in extent, containing almost one third of the whole country, it seems justly entitled to the first. It is bounded to the north by the cantons of Basil and Solothurn, and the Austrian forest-towns; to the south by the lake of Geneva, the Valais, and duchy of Savoy; to the east by Uri, Unterwald, Lucern, and the county of Baden; and to the west by Solothurn, Neuchâtel, Franche-Comte, the district of Biel, and the land of Gex. It is the most fruitful, the richest, and by much the largest, of all the cantons, extending in length about sixty leagues, and about thirty where broadest. It yields not only plenty of grain, fruit, and pasture; but also good wine, a variety of coloured earths and clays, sand-stone, mundick, gypsum, pit-coal, sulphur, and iron-ore. Here likewise are large herds of cattle, great and small; and, in consequence of that, great quantities of milk, butter, and cheese. The rivers that water this canton are the Aar, the Emmat, the Wigger, the Aaa, the Ruzs, the Limmat, the Sanen, the Senfen, and the Kandel. The principal lake is that of Geneva; the length of which is about 18 leagues, and the greatest breadth between three and four. The depth in some places is near 400 fathom, in others not above 40. The Rhone enters it at the east end near Bouvet, and issues out again at the west close by Geneva. In summer its waters are much swelled by the melting of the snow on the mountains. This lake, however, is not entirely surrounded by the territory of Bern, but partly by Savoy and the country of Gex; the former of which belongs to the king of Sardinia, and the latter to France, and the territory of Sion. Its borders are extremely fertile and beautiful, being much embellished with vineyards, which yield excellent wine, and interspersed with towns and villages, betwixt which a considerable commerce is carried on. The other great lakes, that are wholly or partly within this canton, are those of Neuchâtel, Biel, Murte, Thun, Brien, and Halwy, which all abound in fish, particularly that of Geneva, where trouts are sometimes caught weighing 40 or 50 pounds. In that of Biel, called also the *Nydau-lake*, are two small islands, one of which is very beautiful. This lake is about three leagues

leagues in length, and one in breadth. Along the whole west and north-west sides of the canton runs that chain of mountains called by the general name of *Jura*; but the several mountains of which it is composed have all their particular names. This canton is well cultivated, and very populous, the number of its subjects being computed at 400,000. German is the prevailing language, but almost all the people of fashion speak either French or Italian; even the common people in the *Pais de Vaud*, and other places that lie towards France or Italy, speak a corrupt French or Italian, or a jargon composed of both. The established religion here, and the other Protestant cantons, is Calvinism, the same both in doctrine and discipline as in Holland; nor is any other tolerated, except in the common bailiages, and the vale of Frick. The ministers are divided into deaneries and classes, and hold yearly chapters or synods. They are kept in a greater dependence on the civil power here, than in the other cantons, and not suffered to interfere with matters of state. The city of Bern first joined the confederacy in the year 1353. Towards the defence thereof the canton now furnishes 2000 men. Every male, from 16 to 60, is enrolled in the militia, and about a third of them regimented. There are officers for every district, whose province it is to see that the men be regularly exercised; that their arms, ammunition, and cloathing, be in good condition; and that they be kept in a constant readiness to march. Once a-year they are drawn out to a general review. The same attention is paid to those that belong to the train of artillery. Some regiments consist of married, and some of unmarried men; some of foot, others of dragoons. There is also one regiment and a troop of cuirassiers. The latter consists entirely of burghers of Bern. Both the horsemen and footmen find their horses, arms, and accoutrements. Besides the arms and artillery in the arsenal at Bern, all the castles, where the country governors or bailiffs reside, are well furnished with them. At Bern is a constant guard or garrison of 200 men, and a small garrison at fort Arburg. In the same city is also an office, which grants licences for levies to foreign powers, and where the recruits make their appearance, and are registered. The bailiffs have the chief direction of affairs in their several districts, being generals of the militia, and presiding in the courts of justice; but, in civil causes, above a certain value, an appeal lies from them to Bern; and, in capital cases, their sentence must be confirmed by the great council before it can be executed. When any bailiwick is to be disposed of, as many balls as there are competitors are put into a bag, whereof one is gilt, and he that draws that has the bailiwick.

Mr Keyser observes, that the wealthiest peasants in Switzerland are those of Bern; it being difficult to find a village without one, at least, who is worth between 20,000 and 30,000 guilders, and sometimes even 60,000. He says, the common people of both sexes wear straw-hats, and that the womens petticoats are tied up so near their arm-pits, that hardly an hand's-breadth is left for their shape; that the inns, not only in this canton but throughout Switzerland, are in general very good; that the manners of the people were, in many respects, greatly changed within 50 years before he visited them, which was about 39 years ago, and con-

sequently must be much more so now; that, instead of the plainness and honest simplicity of their ancestors, the love of superfluities and high living greatly prevailed; that luxury, pomp, and that insatiation for foreign productions, which had infected most parts of Europe, had also extended its contagious influence to Switzerland, though not to such a degree as in many other countries. Dr Burnet says, that drinking is so common, and produces so many quarrels and disorders, that the bailiffs not only subside by the fines payable for them, but often get estates, carrying, perhaps, twenty thousand crowns at the end of five years to Bern; that their law is short and clear, inasmuch that the most intricate suit is ended after two or perhaps three hearings, either in the first instance, before the bailiff, or in the second, at Bern; that the civility expressed in this country to women, at first meeting them, is not by saluting them, but by shaking them by the hand, and that none but strangers take off their hats to them. Mr Addison says, that the peasants are generally clothed in a coarse kind of canvas, the manufacture of the country, and that their holiday clothes go from father to son; so that it is not uncommon to see a countryman in his great-grandfather's doublet and breeches; that the belief of witchcraft prevailed among them so much, that there were some executions on that account while he was in the country; that the question, or torture, is used not only in this canton but all over Switzerland; that though the subjects of the state are rich, the public is poor; and though they could oppose a sudden invasion, yet that their unkindly soil requires such a number of hands to cultivate it, that they could not spare the reinforcements and recruits that would be necessary in a long war. Upon extraordinary occasions, however, they boast that they could raise eighty thousand men in 24 hours. This canton is divided into the German country, that is, that part of the canton in which the German tongue is spoken, and which is also called the *ancient canton*, extending from Morat to the county of Baden; and the Roman, called also the *Waal*, and *Pais de Vaud*. The former of these contains 35 bailiwicks, and about 300 parishes.

BERN, a city of Switzerland, and capital of the canton of that name, is situated in E. Long. 7. 40. N. Lat. 40. 0. It is said that the taking of a bear on the day on which the foundation of this city was laid, gave occasion to its name; hence it is often in Latin called *Arctopolis*, i. e. the city of the bear, and has a bear for its coat of arms. It is almost surrounded by the river Aar. The houses are mostly built of white free-stone, and, in the principal streets, have piazzas or arches under them, for the convenience of walking dry in wet weather. Most of the streets are paved with flints, and traversed by a canal lined with free-stone, which is brought from a considerable distance, and is very useful in carrying off the filth of the city, extinguishing fires, and other purposes. The city is large, standing almost in the middle of the canton, and containing several churches, of which one is called the *Great Church*, and the first minister thereof the *dean*, who is the head of the city-clergy. From an inscription near the great door of this church, it appears, that the first stone of it was laid in 1421. Over the same door is a representation of the last judgment, in which the sculptor hath placed the pope among the damned.

Bern. In this city is also a college with eight professors, a large public library, and a museum; a stately granary, in which a great quantity of corn is always kept; a guildhall; a well stored arsenal; and several hospitals. In the arsenal is a wooden statue of the famous Tell, which represents him as taking aim at the apple placed on the head of his son. There is also the statue of Berch told von Zahringen, the founder of the city; and two large horns of buffaloes or wild bulls, called in Latin *Uri*, such as are used in war by the canton of Uri instead of trumpets, and taken from it in the year 1712. Hard by also hang the grotesque dresses of those who blew them. The inhabitants of Uri, who boast their descent from the old Tau, bear a buffalo's head in their risci, coat of arms; and the person who blows the great horn in time of war, is called the *bull of Uri*. In the Dominican church, a hole in the wall is always shewn to strangers, by means of which, it having a communication with the cell of a monk in an adjoining monastery, the pious fraud of making an image of the Virgin appear to speak was once carried on, which for a while answered the purposes of the monks very well; but they were at last detected and punished. This city, though larger, is not so populous nor so well built as that of Zurich. On the east side of it is a handsome stone bridge; and near the great church is a very fine platform some hundred feet in height, which makes a most delightful walk, being planted with limes, and commanding a charming prospect, particularly of the mountains of the Grisons, covered with snow in the midst of summer. In 1654 a student of divinity, being on horseback, and in liquor, leaped over this terrace without receiving any other hurt than breaking a leg, and lived many years after, but the horse was killed. In the upper part of the city are always kept a number of bears in two inclosures, with fir-trees for them to clamber and play upon. Of the burghers of Bern, only those are qualified for the government and magistracy of the city, who are the descendants of such as were made burghers before the year 1635. Other qualifications are also necessary; in particular, they must not be under 30 years of age, and must be enrolled in one of the 12 companies. To obtain a country government, or to hold any considerable employment, the candidate also must be married. The great council, in which the sovereignty of the canton is vested, consists, when full, of 229; but is generally much short of that number, 80 or more often dying before their places are filled up. The lesser council senate, or, as it is called, the *daily council*, because it meets every day, Sundays and holidays excepted, consists of 27 members, including the two prætors or advoyers, the four tribunes of the people, the two treasurers, and the two heimlichers or secretemen, so called because to them all secrets relating to the state are discovered. The members of the great and little councils mutually fill up the vacancies that happen in these two colleges. How the bailiffs are chosen we have already taken notice. Our limits will not permit us to enter into any further detail with respect to the government: only it is to be observed in general, that all the officers of any note are chosen out of the great or little councils; and that all the bailiffs and castellans of the canton continue fix years in office. The trade of the city is not very great, but was less

before the French refugees settled therein: some, however, doubt whether it has been a gainer by them; as by their introduction of French modes and luxury, they have helped to banish the ancient Helvetic simplicity and frugality. The territory immediately under its jurisdiction is divided into four governments, with which the four vanners, or standard-bearers, are invested. It declared for the reformation in 1528, after a solemn disputation. Here the British envoy to the cantons resides.

BERN-Machine, the name of an engine for rooting up trees, invented by Peter Sommer, a native of Bern in Switzerland.

This machine is represented by a figure on plate LVII. fig. 2. drawn from a model in the machine-room of the Society for the Encouragement of Arts, &c. It consists of three principal parts; the beam, the ram, and the lever. The beam ABC, (n° 1.) of which only one side is seen in the figure, is composed of two stout planks of oak three inches thick at least, and separated by two transverse pieces of the same wood at A and C, about three inches thick. These planks are bored through with corresponding holes, as represented in the figure, to receive iron pins, upon which the lever acts between the two sides of the beam, and which are shifted higher and higher as the tree is raised or rather pushed out of its place. The sides are well secured at the top and bottom, by strong iron hoops. The iron pins on which the lever rests should be an inch and a quarter, and the holes through which they pass an inch and a half, in diameter. The position of these holes is sufficiently indicated by the figure. The foot of the beam, when the machine is in action, is secured by stakes, represented at G, driven into the earth. The ram D, which is made of oak, elm, or some other strong wood, is capped with three strong iron spikes, represented at *f*, which take fast hold of the tree. This ram is six or eight inches square; and a slit is cut lengthwise through the middle of it, from its lower end at K, to the first ferule *a*, in order to allow room for the chain *g h* to play round the pulley K, which should be four inches thick, and nine inches in diameter. This ram is raised by means of the chain *g h*, which should be about ten feet long, with links four inches and three quarters in length, and an inch thick. One end of this chain is fastened to the top of the beam at C, while the other, after passing through the lower part of the ram, and over the pulley K, terminates in a ring or link represented n° 3. the two ears *m n* of which serve to keep it in a true position between the two planks of the beam. In this ring the hook P is inserted. The hook is represented in profile, n° 2. where F is the part that takes hold of the ring. But it must be observed, that the parts of this machine, represented in n° 2, 3, are drawn on a scale twice as large as the whole engine. The hook F, n° 2. should be made of very tough iron, as well as the handle D, and the arch E *c*. This handle should be two inches thick at *z*, where it joins to the hook, and the thickness gradually lessen by degrees up to the arch, which need not be more than half an inch thick. On each side of the pin *z*, is a semi-circular notch, *x, y*, which rests alternately on the pins when the machine is worked. The hole D, and the arch E *c*, serve to fix a long lever of wood E F, n° 1. by means

means of two iron pins; and by this contrivance the lever is either raised or depressed at pleasure, in order to render the working of the machine easy in whatever part of the beam the lever may be placed: for without this contrivance the extremity of the lever EF, would, when the handle was near the top of the beam, be much higher than men standing upon the ground could reach. It must however be remembered, that the lever is often shortened by this contrivance, and consequently its power lessened.

The machine is worked in the following manner: It is placed against a tree, in the manner represented in the figure, so that the iron spikes at *f* may have hold of the tree, and the end of the beam A be supported by stakes represented at G. The iron handle, n^o 2. is placed in the opening between the two planks of the beam, and the wooden lever fixed to it by means of the iron pins already mentioned. The hook F takes hold of the chain, and one of the iron pins is thrust into the outer row of holes, by which means the outer notch *x* will rest on the pin, which will be now the centre of motion; and the end of the lever E, n^o 1. being pressed downwards, the other notch *y*, n^o 2. will be raised, and at the same time the chain, and consequently the ram. The other iron pin is now to be thrust into the hole in the inner row, next above that which was before the centre of motion, and the end of the lever E elevated or pushed upwards, the latter pin on which the notch *y* rests now becoming the centre of motion. By this alternate motion of the lever, and shifting the pins, the chain is drawn upwards over the pulley K, and consequently the whole force of the engine exerted against the tree. There is a small wheel at L, in order to lessen the friction of that part of the machine.

From this account the reader will very easily perceive that the machine is nothing more than a single pulley, compounded with a lever of the first and second order. It must however be remembered, that as the push of the engine is given in an oblique direction, it will exert a greater or lesser force against the horizontal roots of the tree in proportion to the angle formed by the machine with the plane of the horizon; and that the angle of 45° is the maximum, or that when the machine will exert its greatest force against the horizontal roots of the tree.

BERNACLE, in ornithology. See ANAS.

BERNARD (St), the first abbot of Clairvaux, was born in the year 1091, in the village of Fontaine, in Burgundy. He acquired for great reputation by his zeal and abilities, that all the affairs of the church appeared to rest upon his shoulders, and kings and princes seemed to have chosen him for a general arbitrator of their differences. It was owing to him that Innocent II. was acknowledged sovereign pontiff, and after the death of Peter Leonis anti-pope, that Victor, who had been named *successor*, made a voluntary abdication of his dignity. He convicted Abelard at the council of Sens, in the year 1140. He opposed the monk Raoul; he persecuted the followers of Arnaud de Bresse; and, in 1148, he got Gilbert de la Porci  , bishop of Poitiers, and Eonde l'Etoile, to be condemned in the council of Rheims. By such zealous behaviour he verified (says Mr Bayle) the interpretation of his mother's dream. She dreamed, when she was with

child of him, that she should bring forth a white dog, whose barking should be very loud. Being astonished at this dream, she consulted a monk, who said to her, "Be of good courage; you shall have a son who shall guard the house of God, and bark loudly against the enemies of the faith." But St Bernard went even beyond the prediction, for he barked sometimes against chimerical enemies: he was more happy in exterminating the heterodox, than in ruining the infidels; and yet he attacked these last, not only with the ordinary arms of his eloquence, but also with the extraordinary arms of prophecy. He preached up the crusade under Lewis the Younger, and by this means he enlarged the troops of the crusaders beyond expression: but all the fine hopes with which he flattered the people were disappointed by the event; and when complaint was made, that he had brought an infinite number of Christians to slaughter, without going out of his own country, he cleared himself, saying, that the sins of the Croises had hindered the effect of his prophecies. In short, he is said to have founded 160 monasteries, and to have wrought a great number of miracles. He died on the 20th of August, 1153, at 63 years of age. The best edition of his works is that of 1690, by father Mabillon.

BERNARD (Dr Edward), a learned astronomer, linguist, and critic, was born at Perry St Paul, on the 2^d of May, 1638, and educated at Merchant-Taylor's school, and St John's college, Oxford. During his stay at school, he had laid in an uncommon fund of classical learning; so that, on his going to the university, he was a great master of all the elegancies of the Greek and Latin tongues, and not unacquainted with the Hebrew. On his settling in the university, he applied himself with great diligence to history, philology, and philosophy; and made himself master of the Hebrew, Syriac, Arabic, and Coptic languages, and then applied himself to the study of the mathematics under the famous Dr Wallis. Having successively taken the degrees of bachelor and master of arts, and afterwards that of bachelor of divinity in 1668, he went to Leyden to consult several oriental manuscripts left to that university by Joseph Scaliger and Levinus Warnerus. At his return to Oxford, he collated and examined the most valuable manuscripts in the Bodleian library; which induced those who published any ancient authors, to apply to him for his observations or emendations from the manuscripts at Oxford; which he readily imparted, grudging neither time nor pains to serve the learned; and by this means he became engaged in a very extensive correspondence with the learned of most countries. In the year 1669, the famous Christopher Wren, Savilian professor of astronomy at Oxford, having been appointed surveyor-general of his majesty's works, and being much detained at London by this employment, he obtained leave to name a deputy at Oxford, and pitched upon Mr Bernard, which engaged the latter in a more particular application to the study of astronomy. In 1676, he was sent by the earl of Arlington to France, in order to be tutor to the dukes of Grafton and Northumberland, sons to King Charles II. by the dutches of Cleveland, who then lived with their mother at Paris: but the simplicity of his manners not suiting the gaiety of the dutches's family, he returned, about a year after, to Oxford, and

Bernard. pursued his studies; in which he made great proficiency, as his many learned astronomical and critical works shew. He composed tables of the longitudes, latitudes, right ascensions, &c. of the fixed stars; Observations in Latin on the Obliquity of the Ecliptic; and other pieces inserted in the Philosophical Transactions. He also wrote, 1. A Treatise of the ancient Weights and Measures. 2. *Chronologia Samaritana Synopsis*, in two tables. 3. Testimonies of the Ancients concerning the Greek Version of the Old Testament by the Seventy; and several other learned works. He was a person of great piety, virtue, and humanity; and died on the 12th of January, 1696, in the 59th year of his age, leaving behind him a great number of learned and valuable manuscripts.

BERNARD (James), professor of philosophy and mathematics, and minister of the Walloon church at Leyden, was born September 1st, 1658, at Nions in Dauphine. Having studied at Geneva, he returned to France in 1679, and was chosen minister of Venterol, a village in Dauphine. Some time after, he was removed to the church of Vinfobres in the same province. But the persecutions raised against the Protestants in France having obliged him to leave his native country, he retired to Holland, where he was received with great civility, and was appointed one of the pensionary ministers of Ganda. In July 1688, he began a political publication intitled *Histoire abrégée de L'Europe*, &c. which he continued monthly till December 1688, and makes five volumes in 12^{mo}. In 1692, he began his *Lettres Historiques*, containing an account of the most important transactions in Europe, with necessary reflections. He carried on this work, which was also published monthly, till the end of the year 1698. It was afterwards continued by other hands, and consists of a great many volumes. Mr Le Clerc having left off his *Bibliothèque universelle*, in 1691, Mr Bernard wrote the greatest part of the 20th volume, and by himself carried on the five following to the year 1693. In 1699, he collected and published *Actes et négociations de la paix de Ryswic*, in four volumes 12^{mo}. In 1698 he began the *Nouvelles de république des lettres*, which he continued till December 1710. Mr Bernard having acquired great reputation by his works, as well as by his sermons at Ganda, and the Hague, the congregation of the Walloon church at Leyden became extremely desirous to have him for one of their ministers; and a vacancy happening in 1705, he was unanimously chosen. About the same time, Mr de Volder professor of philosophy and mathematics at Leyden having resigned, Mr Bernard was appointed his successor; and the university presented him with the degrees of doctor of philosophy and master of arts. His public and private lectures took up a great part of his time; yet he did not neglect his pastoral function, but composed his sermons with great care: he wrote also two excellent treatises, one on a late repentance, the other on the excellency of religion. In 1716, he published a supplement to Moreri's dictionary in two volumes folio. The same year he resumed his *Nouvelles de la république des lettres*; which he continued till his death, which happened the 27th of April, 1718, in the 60th year of his age.

BERNARD the Great (St); a mountain in Savoy and Switzerland, between Valais and the valley of Aouft,

at the source of the rivers Drance and Doria. The top is always covered with snow, and there is a great monastery seated thereon, where the monks always entertain travellers without distinction of religion for three days.

BERNARDINE (St), was born at Massa in Tuscany, in 1380. In 1404 he entered into a Franciscan monastery near Sienna, where he became an eminent preacher; and was afterward sent to Jerusalem, as commissary of the Holy Land. On his return to Italy, he visited several cities, where he preached with such applause, that the cities of Ferrara, Sienna, and Urbino, desired Pope Eugenius IV. to appoint him their bishop; but Bernardine refused the honour, accepting only the office of vicar-general of the friars of the observance for all Italy. He repaired and founded above 300 monasteries in that country; died in 1444; was canonized in 1450 by Pope Nicholas, and his works were published at Venice, in 1591, in 4 vols 4^{to}.

BERNARDINES, an order of monks, founded by Robert abbot of Moleme, and reformed by St Bernard. They wear a white robe with a black scapulary; and when they officiate they are clothed with a large gown, which is all white, and hath great sleeves, with a hood of the same colour.—The Bernardines differ very little from the Cistercians. They had their origin toward the beginning of the 12th century.

BERNAY, a town of Upper Normandy in France, seated on the river Carantoue, in E. Long. o. 50. N. Lat 49. 6.

BERNBURG, a town of Germany, in the circle of Upper Saxony, and principality of Anhalt, where a branch of the house of Anhalt resides. It is seated on the river Sara, in E. Long. 12. 30. N. Lat. 51. 55.

BERNERA, one of the Western Isles of Scotland, lying about two leagues to the southward of Harries. It is about five miles in circumference; the soil is sandy, but, when manured with the alga marina, extremely fertile, producing an increase of 30 fold of barley; nay, one grain has been known to produce 14 ears when the season was remarkably favourable. The face of the island is extremely agreeable in summer, exhibiting a pleasing variety of corn fields and clover pasture. Here is a fresh-water lake called *Lochbrunn*, diversified with small islands, and abounding with eels, which the natives, by the help of lights, catch in the night-time, as they fall down a rivulet towards the sea in heaps twisted together. There are two chapels in this island dedicated to St Adaph and St Columbus; and near the former is a stone standing about 8 feet above the ground. At the east end of this island there is a strange reciprocation of the flux and reflux of the sea, and another no less remarkable upon the west side of the long island. The tides from the south-west run along northward; so that during the ordinary course of the tides the flood runs east in the frith where Bernera lies, and the ebb runs west: thus the sea ebbs and flows regularly for four days before, and as long after, the full and change of the moon; the spring-tides generally rising 14 feet perpendicular, and the others proportionably: but for four days before, and as many after, the quarter moons, there is a singular variation; at that time a southerly moon making high water, the course of the tide being eastward, it begins to flow at half an hour after nine in the morning, and continues to flow till half an hour after

ter three in the afternoon, when it is high water; but when it begins to ebb, the current still runs eastward, until it is low water; so that the tide runs eastward 12 hours together, that is, from half past nine in the morning, till half past nine at night; yet when the night tide begins to flow, the current turns and runs westward all night for 12 hours, during both flood and ebb: thus the reciprocations continue, one flood and ebb running eastward, and another westward, till within four days of the full and change of the moon; then they resume their ordinary course, running east during the six hours of flood, and west during the six hours of ebb. There is another phenomenon in these tides no less remarkable than that just now mentioned. Between the vernal and autumnal equinox, that is, during one half of the year, the tides about the quarter moons run all day eastward, and all night westward; and during the other six months their course is reversed, being westward in the day, and eastward in the night.

BERNICLA, in ornithology, the trivial name of a species of anas. See ANAS.

BERNICLE, in zoology. See LEPAS.

BERNIER (Nicholas), an eminent musician and composer, was born at Mante on the Seine, in the year 1664. By his merit in his profession he attained to be conductor of the music in the chapel of St Stephen, and afterwards in that of the king. The regent duke of Orleans admired his works, and patronized their author. This prince having given him a motet of his own composition to examine, and being impatient for his observations thereon, went to the house of Bernier, and entering his study, found the abbe de la Croix there criticising his piece, while the musician himself was in another room carousing and singing with a company of his friends. The duke broke in upon and interrupted their mirth, with a reprimand of Bernier for his inattention to the task assigned him. This musician died at Paris in 1734. His five books of Cantatas and Songs for one and two voices, the words of which were written by Rousseau and Fufelier, have procured him great reputation. There are besides of his composition Les Nuits de Seceaux, and many motets, which are still in great esteem.

BERNIER (Francis), surnamed the *Mogul*, on account of his travels and residence in that country, was born at Angers, in France; and after he had taken his degree of doctor of physic at Montpellier, left his country in 1654, went to Egypt, to the Holy Land, and to the kingdom of the Mogul, where he was physician to that monarch, attended him in his journeys, and stayed there 12 years. Upon his return to France, he published the History of the countries he had visited; and spent the remainder of his life in composing various other works, particularly an Abridgement of the philosophy of Gassendus in 8 vols 12mo. His first work is esteemed to be the best account we have of the countries which are the subject of it.

BERNINI (John Laurence), commonly called *Ca-valiero Bernin*, a Neapolitan, famous for his skill in painting, sculpture, architecture, and mechanics. He first began to be known under the pontificate of Paul V. Rome is indebted to this artist for some of its greatest ornaments; and there are in the church of St Peter, no less than 15 different works of his hand. He died at Rome, in 1680.

BERNO, albot of Richenon, in the diocese of Constance, who flourished about the year 1008, is celebrated as a poet, rhetor, musician, philosopher, and divine. He was the author of several treatises on music, particularly of one *De Instrumentis Musicalibus*, beginning with the words *Musican non esse contenti* which he dedicated to Aribon, Archbishop of Mentz. He also wrote *De Mensura Monochordi*. But the most celebrated of his works is a treatise *De Musica seu Tonis*, which he wrote and dedicated to Pellegrinus archbishop of Cologne, beginning *Verò mundi istius adven-e et peregrino*. This latter tract is part of the Basil manuscript, and follows the Enchiridion of Odo: it contains a summary of the doctrines delivered by Boetius, an explanation of the ecclesiastical tones, intermixed with frequent exhortations to piety, and the application of music to religious purposes. He was highly favoured by the emperor Henry II. for his great learning and piety; and succeeded so well in his endeavours to promote learning, that his abbey of Richenou was as famous in his time as those of St Gaul and Cluni, then the most celebrated in France. He died in 1048; and was interred in the church of his monastery, which but a short time before he had dedicated to St Mark.

BERNOULLI (James), a celebrated mathematician, born at Basil, the 27th of December 1654. Having taken his degrees in the university of Basil, he applied himself to divinity, not so much from inclination as complaisance to his father. He gave very early proofs of his genius for mathematics, and soon became a geometrician, without any assistance from masters, and at first almost without books: for he was not allowed to have any books of this kind; and if one fell by chance into his hands, he was obliged to conceal it, that he might not incur the reprimands of his father, who designed him for other studies. This severity made him chafe for his device, Phaeton driving the chariot of the sun, with these words, *Invito patre fidera verſo*, "I traverse the stars against my father's inclination." This had a particular reference to astronomy, the part of mathematics to which he at first applied himself. But the precautions of his father did not avail, for he pursued his favourite study with great application. In 1656 he began his travels. When he was at Geneva, he fell upon a method to teach a young girl to write, though she had lost her sight when she was but two months old. At Bourdeaux he composed universal gnomonic tables, but they were never published. He returned from France to his own country in 1680. About this time there appeared a comet, the return of which he foretold; and wrote a small treatise upon it, which he afterwards translated into Latin. He went soon after to Holland, where he applied himself to the study of the new philosophy. After having visited Flanders and Brabant, he went to Calais, and passed over from thence to England. At London he contracted an acquaintance with all the most eminent men in the several sciences; and had the honour of being frequently present at the philosophical societies held at the house of the famous Mr Boyle. He returned to his native country in 1682; and he exhibited at Basil a course of experiments in natural philosophy and mechanics, which consisted of a variety of new discoveries. In 1682, he published his essay of a new system of comets; and the year following, his dissertation on the weight of air.

Berno,
Bernoulli.

Bernoulli
 or
 Berner.

Mr Leibnitz, about this time, having published in the *Acta Eruditorum* at Leipzig some essays of his new *Calculus differentialis*, or *infinitesimæ petitæ*, but concealed the art and method of it; Mr Bernoulli, and one of his brothers, discovered, by the little which they saw, the beauty and extent of it: they endeavoured to unravel the secret; which they did with such success, that Mr Leibnitz declared, that the invention belonged to them as much as to himself. In 1687, the professorship of mathematics at Basil being vacant, Mr Bernoulli was appointed his successor. He discharged this trust with universal applause; and his reputation drew a great number of foreigners from all parts to hear his lectures. He had an admirable talent in teaching, and adapting himself to the different genius and capacity of his scholars. In 1699, he was admitted into the academy of sciences at Paris as a foreign member, and in 1701 the same honour was conferred upon him by the academy of Berlin. He wrote several pieces in the *Acta Eruditorum* at Leipzig, the *Journal des Sçavans*, and the *Histoire de l'Académie des sciences*. His assiduous application to his studies brought upon him the gout, and by degrees a slow fever, of which he died the 16th of August 1705, in the 58th year of his age.—Archimedes having found out the proportion of a sphere to a cylinder circumscribed about it, ordered it to be engraven upon his monument. In imitation of him, Mr Bernoulli appointed, that a spiral logarithmical curve should be inscribed upon his tomb, with these words, *Eadem mutata resurgo*; in allusion to the hopes of the resurrection, which are represented in some measure by the properties of the curve which he had the honour of discovering.

BEROEÆ, (anc. geog.) a noble city of Macedonia to the south of Edeffa, or *Ægeæ*, and south-east of Cyrtus. The people are commended in Scripture for their reception of the Gospel on a fair and impartial examination; now supposed to be *Aleppo*. See that article.

BEROOT, a town of Phœnicia, a province of Syria in Turkey in Asia. It is the ancient Berytus; but there are now no remains of its former beauty, except its situation, which is very agreeable, and in a fertile soil. It is just far enough from the sea to prevent the inconveniences of an inundation. There are very fine streams of water which flow from the mountains, and are dispersed into beautiful fountains through several parts of the town. The great Christian church is turned into a mosque, and there is a poor old one for the use of the Greeks. It is adorned with several old pictures, particularly that of St Nicéphorus, with a beard down to his feet. The wall on the south side of the town is yet entire, and seems to have been built out of the ruins of the old city. At a little distance from the city there are pillars of granite, and the ruins of floors of mosaic work. On the sea-shore is an old ruined castle, and the remains of a mole. E. Long. 35. 38. N. Lat. 34. 18.

BEROSUS, priest of the temple of Belus at Babylon, in the time of Ptolemy Philadelphus, wrote the History of Chaldaea, which is often cited by the ancients, and of which Josephus gives some curious fragments. The Athenians, according to Pliny, caused his statue, with a golden tongue, to be placed in their Gymnasium.

BERRE, a town of Provence in France, seated on

a lake of the same name. It is remarkable for the quantity and goodness of the salt that is made there, but the air is very unwholesome. E. Long. 4. 32. N. Lat. 43. 32.

BERRIMAN (Dr William), was the son of Mr John Berriman apothecary in Bishopsgate-street, London, where he was born on the 24th of September 1688. He studied at Oriel-college, Oxford, where he took his several degrees, and became curate and lecturer of All-hallows, in Thames-street, and lecturer of St Michael's, Queenhithe. In 1720, he was appointed domestic chaplain to Dr Robinson bishop of London, who soon after collated him to the living of St Andrew's Underhaft; and in 1727, he was elected fellow of Eton-college. He died on the 5th of February, 1750, in the 62^d year of his age. He wrote, 1. A seasonable review of Mr Whiston's account of primitive doxologies. 2. An historical account of the Trinitarian controversy, in 8 sermons, at lady Moyer's lecture. 3. Brief remarks on Mr Chandler's introduction to the history of the inquisition. 4. Sermons at Boyle's lectures, 2 vols 8vo. 5. Christian doctrines and duties explained and recommended, in 2 vols 8vo; and other works.

BERRY. See **BACCA**.

BERRY, a province of France, with the title of a duchy. It is bounded on the north, by Solome; on the south, by Marche; on the east, by Nivernois and Bourbonnois; and on the west, by Touraine. It is 90 miles in length from north to south, and 75 in breadth from east to west. The air is very temperate; and the soil produces wheat, rye, and wine little inferior to Burgundy; that of Saucerre, St Satur, and Lavernulle, is the best. The fruits are in plenty, and pretty good. The pastures are proper to fatten sheep. This country produces also a good deal of hemp and flax. There are mines of iron and silver, but they are neglected. The stone quarries, within half a league of Bourges, are very servicable. In the parish of St Hilaire there is a mine of oker, made use of in melting metals, and for painting. Near Bourges there is a cold mineral spring, which has a clammy fat pellice over it every morning, of different colours. It lets fall a fine black smooth sediment, which has the same smell, and almost the same taste, as gunpowder, which makes some conclude it partakes of sulphur, vitriol, and oker. The pellice is as thick as a crown-piece; and when put on a red hot fire-shovel will bounce and sparkle, as will also the sediment. It is certain there is felt-petre in these waters, though vitriol seems to be the most predominant. These waters, drunk on the spot, temperate the heat of the blood and humours, open obstructions, and strengthen the fibres. Berry is watered by several rivers, the principal of which are the Loire, the Creuse, the Cher, the Indre, the Orron, the Evre, the Auvrette, the Maulon, the great and little Sandre, the Nerre, &c. Near Liniers, there is a lake 20 miles round. Berry is divided into the upper and the lower, and Bourges is the capital city. The inhabitants of Bourges carry on a small trade with corn down the Loire; but that of the wine above mentioned is much more considerable, it being transported to Paris by means of that river and the canal of Briare. But the principal commerce consists in the fat cattle which they send to Paris, and the great number of sheep; these last bear fine wool, which is used

Berriman
 Berry

used in the manufactures of this province, and other parts of the kingdom. There are two forts of manufactures in Berry, the one for cloths and ferges, and the other for knit and wove stockings. There is likewise a great quantity of hemp, which is transported elsewhere, for they have not yet got the art of manufacturing it themselves. At Aubigny there are 2000 persons generally employed in the making of cloth.

BERSELLO, a fortified town of Italy in the Modeneſe. It was taken by prince Eugene in 1702, and by the French in 1703, who were obliged to abandon it in 1707. It is ſeated near the confluence of the rivers Linza and Po, in E. Long. 10. 30. N. Lat. 44. 55.

BERSUIRE, a town of France in Lower Poictou. W. Long. 0. 27. N. Lat. 46. 52.

BERTINERO, a town of Romagna in Italy, with a ſtrong citadel. It is the ſee of a biſhop; and is ſeated on an hill, in E. Long. 11. 47. N. Lat. 44. 8.

BERTRAND (St), an episcopal town of France, in Gaſcony, and capital of the country of Comminges. E. Long. 0. 38. N. Lat. 43. 2.

BERVY, a ſea-port and parliament town in the county of Mearns in Scotland. W. Long. 2. 0. N. Lat. 56. 40.

BERWICK (the duke of), was natural ſon of James II. by Mrs Arabella Churchill, ſiſter to the great duke of Marlborough. He followed the fate of his father, and came into France after the revolution with James II. Here the duke of Berwick was recommended to the court by his ſuperior merit: he was created maſhal of France, knight of the Holy Ghoſt, duke and peer of France, grandee of Spain, commander in chief of the French armies; in all which ſtations his behaviour was ſuch, that few equalled, perhaps none ſurpaſſed, him. He lived in an age when the renowned prince of Orange and many other of the greateſt men commanded againſt him. His courage was of the cool, ſteady kind; always poſſeſſing himſelf, taking all advantages, not fooliſhly, raſhly, or wantonly throwing away the lives of his ſoldiers. He kept up on all occaſions the moſt ſtrict diſcipline; and did not ſpare puniſhment among his ſoldiers for marauding and other crimes, when properly deſerved; for which ſome inconfiderate people have blamed him. He has been reflected upon by the very zealous and violent adherents of the Stuart family, for not being ſufficiently attached to that party, which was his own family. But by a cool examination of his actions, it will appear, that his behaviour in this particular was, as in moſt parts of his life, ſenſible and juſt. When he accepted of employments, received honours, dignities, and became a naturalized Frenchman, he thought it his duty, as an honeſt man, to become a Frenchman, and a real ſubject to the monarch who gave him bread; and to be, or not to be, in the intereſt of the Stuart family, according to the will and commands of the ſovereign whom he ſerved, and in the intereſt of France according to time and circumſtances; for there is no ſerving two maſters well. But when ordered by his king to be in that family's intereſt, he acted with the greateſt ſincerity; and took the moſt effectual and ſenſible methods to ſerve that unhappy houſe, as the following anecdote, if true, and it has great appearance and probability on its ſide, proves. The duke of Marlborough, after the ſigning of the treaty of Utrecht, was cenſured by the Britiſh parlia-

ment for ſome of the army contracts in relation to bread and forage; upon which he retired into France: and it was then credibly aſſerted, the duke of Marlborough was brought over to the intereſt of the Stuart family; for it is now paſt a doubt that queen Anne had a very ſerious intention of having her brother upon the throne of England after her death: and ſeveral circumſtances, as well as the time of that duke's landing in England, make many people believe he was gained over to the Stuart party. If the duke of Berwick was, directly or indirectly, the means of gaining his uncle over to that intereſt, he more effectually ſerved it than that raſh mock army of unhappy gentlemen who were taken priſoners at Preſton in 1715 had it in their power to do. In a word, the duke of Berwick was, without being a bigot, a moral and religious man; and ſhewed by his life and actions, that morality and religion are very compatible and conſiſtent with the life of a ſtateſman and a great general; and if they were oftener united in thoſe two profeſſions, it would be much happier for the reſt of mankind. He was killed by a cannon-ball at the ſiege of Philipſburgh, in 1738.

BERWICK, a ſhire in Scotland, bounded by the river Tweed, on the ſouth; by Lothian, on the north; by the German Ocean, on the eaſt; and by Teviotdale on the weſt. It abounds with corn and graſs, and has in it ſeveral ſeats of perſons of quality. The principal rivers are the Tweed, the Whiteater, Blackadder, Eye, and Ednel. The principal place is the town and caſtle of Dunſe, which is the beſt place for trade in the country. It ſends two members to parliament.

BERWICK (North), a town of Scotland, in the county of Lothian, ſeated on the Frith of Forth. It was near this place that general Cope was defeated by the rebels in 1745; and made his eſcape to Berwick-upon-Tweed. W. Long. 2. 29. N. Lat. 5. 56.

BERWICK-upon-Tweed, is a town on the borders of England and Scotland, and a county of itſelf. It ſtands on the north or Scotch ſide of the river Tweed; and is pleaſantly ſituated on an eaſy declivity, almoſt cloſe to the ſea. It has a ditch on the north and eaſt; but on the ſouth and weſt it has high walls, regularly fortified, and planted with cannon, and to which the river ſerves as a moat. The houſes are generally well built; and the town-houſe is a handſome ſtructure, with a lofty turret, in which are eight bells, and a ſine clock, which tells the quarters, with four dials, one on each ſide the ſquare. The church is a neat building, but has no bells. The bridge is 947 feet long, and is ſupported by fifteen arches. The barracks form a large regular ſquare, and will hold two regiments of foot very conveniently. The town is governed by a mayor, recorder, town-clerk, and four bailiffs; and has a coroner, a treaſurer, four ſerjeants at mace, and a water bailiff. It had a ſtrong caſtle, which now lies quite in ruins. It has a market on Saturdays, extremely well ſupplied; and a fair on Friday in Trinity-week for black cattle and horſes. Corn and eggs are ſhipped from hence for London and other ports; but the principal trade is the falmon which are caught in the Tweed, and reckoned to be as good as any in the kingdom. Some are ſent alive, and ſome pickled in kits by perſons who ſubſiſt on that employment and are called *ſalmon coopers*. In June and July falmon is ſold for a penny a pound. The living is a rectory, rated at 20l. a year in the king's

Bery king's books. W. Long. l. 35. N. Lat. 55. 58.

BERY, or BURY, the vill or seat of habitation of a nobleman, a dwelling or mansion-house, being the chief of a manor: from the Saxon *beorg*, which signifies a *hill* or *castle*; for heretofore noblemen's seats were castles situated on hills, of which we have still some remains; as in Herefordshire, there are the *beries* of Stockton, Hope, &c. It was anciently taken for a sanctuary.

BERYL, in natural history, called by our lapidaries *aqua marina*, is a pellucid gem of a bluish green colour, found in the East Indies and about the gold mines of Peru: we have also some from Silesia, but what are brought from thence are oftener coloured crystals than real beryls; and when they are genuine, they are greatly inferior both in hardness and lustre to the oriental and Peruvian kinds.

The beryl, like most other gems, is met with both in the pebble and columnar form, but in the latter most frequently. In the pebble form it usually appears of a roundish but flattened figure, and commonly full of small flat faces, irregularly disposed. In the columnar or crystalline form it always consists of hexangular columns, terminated by hexangular pyramids. It never receives any admixture of colour into it, nor loses the blue and green, but has its genuine tinge in the degrees from a very deep and dusky to the palest imaginable of the hue of sea-water.

The beryl, in its perfect state, approaches to the hardness of the garnet, but it is often softer; and its size is from that of a small tare to that of a pea, a horse-bean, or even a walnut. It may be imitated, by adding to 20 pounds of crystal-glass made without magnesia, six ounces of calcined brass or copper, and a quarter of an ounce of prepared zaffre.—The properties of the beryl were very wonderful in the opinion of the ancient naturalists; it kept people from falling into ambuscades of enemies, excited courage in the fearful, cured diseases of the eyes and stomach. It does none of these things now; because people are not simple enough to believe it has the virtue to do them.

BERYL-crystal, in natural history, a species of what Dr Hill calls *ellipomacrostylis*, or imperfect crystals, is of an extreme pure, clear, and equal texture, and scarce ever subject to the slightest films or blemishes. It is ever constant to the peculiarity of its figure, which is that of a long and slender column, remarkably tapering towards the top, and very irregularly hexangular. It is of a very fine transparency, and naturally of a pale brown; and carries such evident marks of distinction from all brown crystals, that our lapidaries call it, by way of eminence, the *beryl-crystal*, or simply the *beryl*.

BERYTUS, (anc. geog.), a sea-port town of Phœnicia on the Mediterranean, so ancient as to be thought to have been built by Saturn. It was destroyed by Tryphon, but rebuilt by the Romans. Agrippa placed here two legions, whence it became a colony. It enjoyed the *jus Italicum*, and had an excellent school for the study of the law in Justinian's time. Now *Beroot*; which see.

BES, or BESSIS, in Roman antiquity, two thirds of the as. See AS.

BES also denotes two thirds of the jugerum*.

BESAILE, signifies the father of a grand-father.

BESAILE, in law, a writ that lies where the great-grandfather was seized in fee of any lands, &c. at the

time of his death; and after his decease, a stranger enters thereon, the same day, and keeps out the heir.

BESANCON, a city of France, capital of the Franche Compté, and one of the most ancient cities of Europe. It is the see of an archbishop, and has a parliament as well as a university. It is seated on the river Dreux, which divides it into two parts, the greatest of which is a peninsula. The entrance is shut up by a mountain, on which they have built a large citadel, which commands all the city. There are many names of places in and about the city, that are plainly corruptions of the Latin, and are marks of its antiquity, as Chamars, Campus Martis, Chamuse, Campus Musarum, Chandane, Campus Dianæ, &c. The metropolitan church is built at the bottom of St Stephen's hill; and is a very handsome structure, with a high tower steeple. The great altar is placed in the middle choir, where on high days they expose reliques in silver shrines, enriched with gold and jewels. There are several tombs and other things remarkable in the churches; and after you have pass'd the church of Notre Dame, and the square that it looks into, you come to a triumphal arch, erected in honour of the emperor Aurelian, on which are several figures of men and animals, pretty entire. It serves as a gate to the cloister of St John the Great. The great hospital of the order of the Holy Ghost is a structure worth seeing. The streets are wide and handsome; and the houses are well built with free-stone, and covered with slate, chiefly about the square called *Battan*, which is adorned with a fountain, the water of which proceeds from the statue of Bacchus. The river Dreux is pass'd over on a stone bridge, to enter from one part of Besancon into the other. The market-place is at the entrance; and on the left is another square, adorned with a fountain, where the great street begins, which traverses all this part, from the bridge to St John the Great. The new square is not far from this street, from whence you go to the town-house, which is a large structure, with four wings, before the front of which is the statue of Charles V. in bronze, with a globe in one hand, and a sword in the other. The imperial eagle is raised over a large bason, and spouts out water by both his beaks. The governor's palace is the most magnificent in the province, and there is a fountain a little farther, adorned with the figure of a naked woman, with water springing out at her nipples. E. Long. 6. 10. N. Lat. 47. 26.

BESANT, or BEZANT, a coin of pure gold, of an uncertain value, struck at Byzantium, in the time of the Christian emperors; from hence the gold offered by the king at the altar, is called *besant* or *bisant*.

BESANTED, or BEZANTED. This word means *full of besants*; and is used to denote a field, ordinary or charge, covered with above eight besants: for if there be but eight or fewer, their number must be particularly mentioned.

BESELEED and OOLIAH, architects, sculptors, and painters, supposed to have made all the ornaments in brass, silver, &c. of the first tabernacle in the wilderness, 1490 B. C.

BESIEKS, or BEZIEKS, an ancient and handsome town of France, in Lower Languedoc, with a bishop's see, and the title of a viscounty. It has a delightful situation; and the country in which it stands is fertile in corn, oil, and produces excellent wine. It is seated

* See Jugerum.

on a hill near the river Orbe, in E. Long. 3. 23. N. Lat. 43. 21.

BESISTAN, or **BERSTEIN**: Thus at Constantinople, Adrianople, and in some other towns within the Grand Signior's dominions, they call those places where the merchants have their shops, and expose their merchandizes to sale. Each sort of merchants have their particular besistan, which must all be understood of the workmen, all those of the same trade working in the same place. These besistans are commonly large galleries, vaulted over, whose gates are shut every night. Sometimes the wardens and keepers of the besistans will answer for the merchandizes, on paying them a very moderate perquisite for every shop.

BESLERIA, (from Basilus Beller an apothecary at Nuremberg, author of a book intitled *Hortus Eysletensis*), a genus of the angiospermia order, belonging to the didynamia class of plants. Of this genus there are three species, the melitifolia, with branching footstalks and oval leaves; the lutea, with simple footstalks growing in clusters, and spear shaped-leaves; and the cristata, with stalks growing single, and a five-leaved involucre. All these are natives of the warm parts of America, and cannot be preserved in this country without artificial heat. But as they are remarkable neither for beauty nor any other property, we forbear any particular description.

BESORCH, a coin of tin, or some alloyed metal, current at Ormus, at the rate of $\frac{2}{3}$ parts of a farthing sterling.

BESSARABIA, a territory of Turkey in Europe, lying between Moldavia, the Danube, the Black-sea, and Little Tartary. It is inhabited by independent Tartars, who maintain themselves by their cattle, husbandry, and by robbery. Their religion, manners, and customs, are the same with those of the Crim Tartars. When there are any forces sent against them, they retire among the mountains near the Black-sea, where it is impossible to come at them on account of the morasses and desiles.

BESSICA, (anc. geog.), a district of Thrace towards mount Hæmus to the south of the Hebrus. It was inhabited by a fierce and barbarous people noted for their robberies. Their chief city Uscudama is now known by the name of *Adrianople*. They lived under their own kings till the consulate of M. Licinius Lucullus and C. Cassius Varus; when the consul Lucullus invaded their country, and having gained a great victory over them, took their metropolis, and subjected the whole nation to the Roman laws. The Romans, notwithstanding they had subdued them by force of arms, still suffered them to live under their own kings; for Piso, while he governed Macedon in quality of proconsul, having treacherously seized Rabocentus, whom Suetonius calls *prince of the Bessi*, caused him to be publicly beheaded. This affront so exasperated the whole nation, that they revolted; but were overthrown in a great battle by Octavius the father of Augustus. During the civil wars of Rome they attempted anew to recover their liberty, but were again defeated by the famous M. Brutus. In the reign of Augustus one Vollogeses, a native of the country, and priest of Bacchus, having, under pretence of religion, drawn together great crowds of people, made himself master of the whole country, and, entering the Chersonesus, com-

mitted there the most dreadful ravages. He was at last, however, overcome by L. Piso; who obliged the savage inhabitants to lay down their arms, and submit to such conditions as he was pleased to impose upon them. From this time the Bessi continued subject to the Romans without attempting any more to regain their liberty.

BESSIS. See **BES**.

BESTAIL, or **BESTIAL**, in ancient statutes, all kinds of beasts, or cattle, especially those purveyed for the king's provision.

BESTIARI, in Roman antiquity, such as fought against beasts, or those who were exposed to them by sentence of the law. There were four kinds of bestiarii: the first were those who made a trade of it, and fought for money; the second were such young men as, to shew their strength and dexterity in managing their arms, fought against beasts; the third kind was, where several bestiarii were let loose at once, well armed, against a number of beasts; and the fourth kind were those condemned to the beasts, consisting either of enemies taken prisoners in war, or as being slaves, and guilty of some enormous crime; those were all exposed naked, and without defence.

BESTRICIA, a town of Transylvania, remarkable for the gold mines in its neighbourhood. E. Long. 22. 5. N. Lat. 48. 0.

BETA, the **BEET**; a genus of the digynia order, belonging to the pentandria class of plants.

Species. 1. The *maritima*, or sea-beet, grows naturally by the sea-side, and in salt marshes, in many parts of England, as also on the Bass island at the mouth of the Forth in Scotland. It has been supposed by many to be only a variety of the common white beet; but Mr Miller assures us he has been unable to make any variation in them by culture. 2. The *hortensis*, or common white beet, is cultivated in gardens for the sake of its leaves, which are frequently used in soups. The root of this sort seldom grows larger than a man's thumb; the spikes of flowers come out from the wings of the leaves, which are long, and have narrow leaves placed between the flowers. The lower leaves of the plant are thick and succulent, and their footstalks broad. The varieties of this are, the white beet, the green beet, and the Swiss or chard beet. These will vary from the one to the other, but have never been found to change to the first or third sort. 3. The *vulgaris*, or red beet, with a pyramidal root, hath large, thick, succulent leaves, which are for the most part of a dark-green or purple colour. The roots of this are large, and of a deep red colour. The larger these roots grow, the tenderer they are; and the deeper their colour, the more they are esteemed. The varieties of this species are, the common red beet, the turnip-rooted beet, and the green-leaved red beet.

Culture. The common white beet is commonly sown by itself in the beginning of March, upon an open spot of ground, not too moist. When the plants have put out four leaves, the ground should be hoed as is practised for carrots, carefully cutting up all the weeds, and also the plants where they are too near each other, leaving them at least six inches asunder. In three weeks or a month's time the ground should be hoed a second time to cut up the weeds and thin the plants to a greater distance, for by this time they will

Bessi
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Beta.

Beta
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Betel.

be out of danger; so should not be left nearer than eight or nine inches, if regard is had to the goodness of the leaves; and if it is of the Swiss kind, with broad leaves, the plants must not be nearer than a foot. In six weeks after, the ground should be hoed over a third time, which if properly done will destroy all the weeds. After this the plants will spread and prevent the weeds from growing, therefore will want but little cleaning for a considerable time, and the leaves will soon be fit for use. The outer larger leaves should be first gathered, leaving the smaller inner ones to grow large; by which method a small spot of ground will supply a moderate family for a whole year, provided the plants are not allowed to run to seed, for in that case they will not be good.

The red beet is frequently sown with onions, carrots or parsnips; but if these are not to be soon removed, the beets ought to be sown by themselves. This sort requires a deep light soil; the seeds should be sown in March, and must be treated in the same manner as the former sort: but the plants should not be left nearer than a foot distance, or in a good land a foot and a half; for the leaves will cover the ground at that distance. The roots will be fit for use in autumn, and continue good all winter; but in the spring, when they begin to shoot, they will be hard and stringy.

Medicinal and other uses. Decoctions of beets gently loosen the belly; hence they have been ranked among the emollient herbs: the plants remaining after the boiling are supposed to have rather a contrary effect. They afford little nourishment, and are said by some to be prejudicial to the stomach. The juice expressed from the roots is a powerful erhine. The root of the red beet is sometimes used to improve the colour of claret; and Mr Margraff found that good sugar might be produced from the roots of the white kind by the methods practised abroad for procuring it from the sugar cane. By some it is recommended to cultivate the white beet in large quantities, as food for cattle*.

BETANZOS, a town of Galicia in Spain, seated on the Maudeo, and a bay of the sea, in W. Long. 7. 50. N. Lat. 43. 21.

BETEL, or BETLE, in botany, an Indian plant of great use and esteem in the east, where it makes a considerable article of commerce. It is a creeping and climbing plant like the ivy; and its leaves a good deal resemble those of the citron, though they are longer and narrower at the extremity. It grows in all parts of India, but thrives best in moist places. The natives cultivate it as we do the vine, placing props for it to run and climb upon; and it is a common practice to plant it against the tree which bears the areca-nut.

At all times of the day, and even in the night, the Indians chew the leaves of the betel, the bitterness of which is corrected by the areca that is wrapped up in them. There is constantly mixed with it the chinam, a kind of burnt lime made of shells. The rich frequently add perfumes, either to gratify their vanity or their sensuality.

It would be thought a breach of politeness among the Indians to take leave for any long time, without presenting each other with a purse of betel. It is a pledge of friendship that relieves the pain of absence. No one dares to speak to a superior unless his mouth is perfumed with betel; it would even be rude to neglect

this precaution with an equal. The women of gallantry are the most lavish in the use of betel, as being a powerful incentive to love. Betel is taken after meals; it is chewed during a visit; it is offered when you meet, and when you separate; in short, nothing is to be done without betel. If it is prejudicial to the teeth, it assists and strengthens the stomach. At least, it is a general fashion that prevails throughout India.

BETELFAGUI, a town of Asia, in Arabia Felix, famous for the vast quantity of coffee bought and sold there; being the mart where the country-people bring their coffee to sell; and where the Europeans come, or send their factors or brokers to purchase it. E. Long. 57. 20. N. Lat. 15. 40.

BETHLEHEM, a town of Palestine, famous for the birth of Jesus Christ. It was once a flourishing town, but is now only a poor village. It is seated on the ridge of a hill, which runs east and west. Here is a church, built by St Helena, in the form of a cross, which is very large; and from its top may be seen all the country round about. The roof is lofty, flat, and composed of cedar on the inside, and leaded without. Both sides of the nave are supported by two rows of marble pillars, each made of one piece, and eleven in a row, inasmuch that they make as it were five naves, separated from each other by these rows of pillars, in each of which is the picture of some saint. On the wall over the pillars there is a very beautiful Mosaic work, on a gold ground. The walls were formerly overlaid with fine marble, but the Turks have taken it to adorn their mosques. The three upper ends of the cross terminate in three semicircles, having in each an altar. Over the chancel there is a flatly cupola, covered with lead on the outside, and within adorned with Mosaic work. Close to the church is the monastery of the Franciscans; which is large, but indifferently built. The gardens are defended with strong walls, and at the north-west of them stands a tower now almost in ruins. Their chapel is better taken care of. Through this there is a passage to a square cave, where they say the Innocents were buried. Beyond this there are passages to the tombs of St Jerom, St Paula, Eustochium, and Eusebius of Cremona. Beyond these there is a grot or cell, which they say was the lodging-place of St Jerom when he translated the Bible. Another entrance leads to a vault or chapel, 12 feet wide and 40 long, whose floor is paved, and sides lined with white marble, and the roof is adorned with Mosaic work, now much decayed. At the end of this there is an arched concavity, with an altar, over which is a picture of the nativity, and under it a vault, the middle of which is a star made with stones of various colours, to mark the place where they say our Saviour was born; and near this is the manger where they pretend he was laid; it is hewn out of a rock, and is now flagged with white marble. The few cottages that are yet standing are inhabited by Greeks and Armenians, who get a poor livelihood by selling the model of the sepulchre and grot of the nativity to strangers, cut in wood or stone; as also by attending on pilgrims. Bethlehem is about six miles west of Jerusalem. E. Long. 35. 55. N. Lat. 31. 30.

BETHLEHEM, a town of the Netherlands, in the province of Brabant, subject to the house of Austria. E. Long. 4. 40. N. Lat. 51. 2.

Betel
Beth

* See Agriculture, no 50.

BETHUNE (Maximilian de), duke of Sully, grand-master of the artillery, and marshal of France, sovereign prince of Enrichemont and Bois-Bell, marquis of Roissy, and one of the ablest and most upright ministers France ever had, was descended from an illustrious house, and was born in 1560. He entered very young into the service of Henry of Bourbon then king of Navarre, afterwards Henry IV. of France, who was just seven years his elder. He was bred in the reformed religion, and continued in the profession of it to the end of his life, though from political motives he advised his master to aljure it, as the only method of putting an end to the miseries of France. After Henry had gained possession of the kingdom, Sully performed all the duties of a great and good minister, while his master exercised all the offices of a great and good king. He had been at the battles of Coutras, Arques, and Ivry; at the sieges of Paris, Noyon, Rouen, and Laon; and signalized himself on every important occasion. In 1597, he was made chief overseer of the highways of France; and the following year, was raised to the post of superintendant of the finances. Though he was then but 40 years of age, and had hitherto signalized himself only in the army, he put the king's finances in such order, that he paid his debts, which amounted to two hundred millions of livres, and laid up great sums in the king's treasury. In 1601, he was made grand-master of the artillery, the next year governor of the Basile, and afterwards superintendant of the fortifications. He was then sent into England as ambassador extraordinary; and had, at his return, the government of Poitou. At last Henry IV. in 1606, erected, in his favour, the territory of Sully on the Loire into a duchy and peerage, and made him grand master of the ports and havens. After the murder of that great prince in 1610, the duke of Sully, who had served him with the greatest zeal and fidelity, was obliged to retire to one of his houses, where he enjoyed a private life; but in 1634 he was made marshal of France, upon which he resigned the post of grand-master of the artillery. He died in his castle of Villebon, on the 21st of December, 1641, at 82 years of age. His Memoirs are ranked among the best books of French history: they contain a most particular account of whatever passed from the peace of 1570, to the death of Henry IV. in 1610: and acquire additional value from the many curious personal anecdotes preserved in them. They were translated into English by Mrs Lennox in 1757.

BETHUNE, a town of France, in Artois, containing upwards of 5000 inhabitants. There is an entrance into this city through four gates, and it is surrounded with walls and fortified. The city and the castle taken together are of a triangular figure, but the castle itself is a very irregular building. The houses are very indifferent, and the streets ill paved; however, there is a large handsome square, and several churches. In the marshy lands, near the city, there are several canals, cut for the convenience of whitening linen. It is seated on a rock by the river Belfe. E. Long. 2. 48. N. Lat. 50. 32.

BETIS, governor of Gaza under Darius, famous for his valour and loyalty; he defended a place of consequence with a few men against Alexander, who was there shot through the shoulder. Betis thinking him

slain, returned triumphantly to the city; but in a second assault he was wounded and brought to Alexander, who cruelly ordered him to be put to death.

BETLEY, a town of Staffordshire in England. It is seated on the confines of the county, next to Cheshire, in a barren sandy soil. W. Long. 2. 15. N. Lat. 53. 0.

BETLIS, a strong town of Armenia or Turcomania belonging to a bey or prince of the country, who is very powerful, and is subject to neither the grand signior nor king of Persia. It lies on the road from Tauris to Aleppo, and the prince can stop caravans whenever he pleases; for the passage between the mountains is so narrow, that ten men can defend it against 1000. The town is seated between two mountains about a cannon shot from each other, and the castle is on an eminence exactly in the middle. This eminence is in the shape of a sugar loaf; and is so steep on all sides, that it is impossible to get up but by winding round about it. The people in and about the town are shepherds, but are ready to take up arms at the command of their prince. E. Long. 42. 40. N. Lat. 37. 20.

BETONICA, or **VERONICA**, (from the Vetones an ancient people of Spain who first used this plant), betony; a genus of the gymnospermia order, belonging to the didymia class of plants.

Species, &c. Of this genus botanical writers enumerate the following species. 1. The officialis, purple or wood betony. 2. The danica, or greater Danish betony. 3. The alpina, or least Alpine betony. 4. The orientalis, or eastern betony, with very long narrow leaves, and a thicker spike of flowers. 5. The incana, or hoary Italian betony, with a flesh coloured flower. Of these the first species only deserves notice. It is a low plant growing in woods and shady places in several parts both of England and Scotland; the flowers come forth in June and July, of a purplish colour, and stand in spikes on the top of the stalks. The leaves and flowers have an herbaceous, roughish, somewhat bitterish taste, accompanied with a very weak aromatic flavour. This herb has been long a favourite among writers on the materia medica, who have not failed to attribute to it abundance of good qualities. Experience, however, does not discover any other virtue in betony than that of a mild corroborant: as such, an infusion or light decoction of it may be drank as tea; or a saturated tincture in rectified spirits given in suitable doses, in laxity or debility of the viscera, and diseases proceeding from thence. The powder of the leaves snuffed up the nose provokes sneezing; and hence betony is sometimes made an ingredient in sternutatory powders: this effect does not seem to be owing, as is generally supposed, to any peculiar stimulating virtues in the herb, but to the rough hairs with which the leaves are covered. The roots of this plant differ greatly in their quality from the other parts: their taste is very bitter and nauseous; taken in a small dose, they vomit and purge violently, and are supposed to have somewhat in common with the roots of hellebore. According to Simon Paulli and Bartholinus, this plant affects those who gather any considerable quantity of it with a disorder resembling drunkenness. Its leaves are sometimes smoked like tobacco.

BETONICA Aquatica. See **SCROPHULARIA**.

BETONICA Pauli. See **VERONICA**.

Betony
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Betterson.

BETONY. See BETONICA.

BETROTHMENT, a mutual promise or compact between two parties for a future marriage. The word imports as much as giving one's troth; that is, true faith, or promise. Betrothment amounts to the same with what is called by civilians and canonists *sponsalia*, or *sponsals*; sometimes *desponsation*, and by the French *fiançailles*.

BETTERTON (Thomas), the celebrated actor, was the son of Mr Betterton under-cook to King Charles I. and was born in Tothill-street, Westminster, in the year 1635. Having received the first rudiments of a genteel education, his fondness for reading induced him to request of his parents that they would bind him apprentice to a book-seller, which was readily complied with, fixing on one Mr Rhodes, near Charing-cross, for his master. This gentleman, who had been wardrobe-keeper to the theatre in Black-friars before the troubles, obtained a licence in 1659, from the powers then in being, to set up a company of players in the Cock-pit in Drury-Lane, in which company Mr Betterton entered himself, and, though not much above 20 years of age, immediately gave proof of the most capital genius and merit.

Presently after the restoration, two distinct theatres were established by royal authority; the one in Drury-Lane in consequence of a patent granted to Henry Killigrew, Esq; which was called the *king's company*: the other in Lincoln's-Inn-Fields who styled themselves the *duke of York's servants*, the patentee of which was the ingenious Sir William Davenant: which last mentioned gentleman having long had a close intimacy with and warm friendship for Mr Rhodes, engaged Mr Betterton, and all who had acted under Mr Rhodes, into his company; which opened in 1662, with a new play of Sir William's, in two parts, called the *siege of Rhodes*. In this piece, as well as in the subsequent characters which Mr Betterton performed, he increased his reputation and esteem with the public, and indeed became so much in favour with king Charles II. that by his majesty's special command he went over to Paris, to take a view of the French stage, that he might the better judge what would contribute to the improvement of our own; and it was upon this occasion, as is generally supposed, that moving scenes were first introduced upon the English theatre, which before had been only hung with tapestry.

In the year 1670, he married one Mrs Sanderfon, a female performer on the same stage, who, both as an actress and a woman, was every thing that human perfection was capable of arriving at, and with whom he through the whole course of his remaining life possessed every degree of happiness that a perfect union of hearts can bestow.

When the duke's company removed to Dorset-Gardens, he still continued with them; and on the coalition of the two companies in 1684, he acceded to the treaty, and remained among them; Mrs Betterton maintaining the same foremost figure among the women, that her husband supported among the male performers. And so great was the estimation that they were both held in, that in the year 1675, when a pastoral called *Calisto* or the *Chaste Nymph*, written by Mr Crown at the desire of queen Catherine consort to Charles II. was to be performed at court by persons

of the greatest distinction, our English Rofcius was employed to instruct the gentlemen, and Mrs Betterton honoured with the tutorage of the ladies, among whom were the two princesses Mary and Anne, daughters of the duke of York, both of whom succeeded to the crown of these realms. In grateful remembrance of which, the latter of them, when queen, settled a pension of 100 l. *per annum* on her old instructors.

In 1693, Mr Betterton having founded the inclinations of a select number of the actors whom he found ready to join with him, obtained, through the influence of the earl of Dorset, the royal licence for acting in a separate theatre; and was very soon enabled, by the voluntary subscriptions of many persons of quality, to erect a new play-house within the walls of the Tennis Court in Lincoln's-Inn-Fields. To this step Mr Betterton is said to have been induced, partly by ill treatment from the managers; and partly with a view to repair, by the more enlarged profits of a manager, the loss of his whole fortune (upwards of 2000 l.) which he had undergone in the year 1692, by adventuring it in a commercial scheme to the East-Indies. Be this however as it will, the new theatre opened in 1695, with Mr Congreve's *Love for Love*, the success of which was amazingly great. Yet in a few years it appeared that the profits arising from this theatre, opposed as it was by all the strength of Cibber's and Vanbrugh's writings at the other house, were very insignificant; and Mr Betterton growing now into the infirmities of age, and labouring under violent attacks of the gout, he gladly quitted at once the fatigues of management, and the hurry of the stage.

The public, however, who retained a grateful sense of the pleasure they had frequently received from this theatrical veteran, and sensible of the narrowness of his circumstances, resolved to continue the marks of their esteem to him, by giving him a benefit. On the 7th of April 1709, the comedy of *Love for Love* was performed for that purpose, in which this gentleman himself, though then upwards of 70 years of age, acted the youthful part of Valentine; as in the September following he did that of Hamlet, his performance of which the author of the Tatler has taken a particular notice of. On the former occasion, those very eminent performers, Mrs Barry, Mrs Braecgirdle, and Mr Dogget, who had all quitted the stage some years before, in gratitude to one whom they had had so many obligations to, acted the parts of Angelica, Mrs Frail, and Ben; and Mr Rowe wrote an epilogue for that night, which was spoken by the two ladies, supporting between them this once powerful supporter of the English stage. The profits of this night are said to have amounted to upwards of 500 l. the prices having been raised to the same that the operas and oratorios are at present; and when the curtain drew up, almost as large an audience appearing behind as before it.

The next winter Mr Betterton was prevailed on by Mr Owen McSwinnay, then manager of the opera house in the Hay market (at which plays were acted four times a-week), to continue performing, tho' but seldom. In consequence of which, in the ensuing spring, viz. on the 25th of April 1710, another play was given out for this gentleman's benefit, viz. *The Maid's Tragedy* of Beaumont and Fletcher, in which he himself performed his celebrated part of Melanthus.

This,

This, however, was the last time of his appearing upon the stage. For having been suddenly seized with the gout, and being impatient at the thoughts of disappointing his friends, he made use of outward applications to reduce the swellings of his feet, which enabled him to walk on the stage, though obliged to have his foot in a slipper. But although he acted that day with unusual spirit and briskness, and met with universal applause, yet he paid very dear for this tribute he had paid to the public; for the fomentations he had made use of occasioning a revulsion of the gouty humour to the nobler parts, threw the distemper up into his head, and terminated his life on the 28th of that month. On the 2^d of May his body was interred with much ceremony in the cloyster of Westminster, and great honour paid to his memory by his friend the Tatler, who has related in a very pathetic, and at the same time the most dignified manner, the process of the ceremonial.

As an *author*, Mr Betterton had a considerable degree of merit. His dramatic works are, 1. *Amorous Widow*, a comedy. 2. *Dioclesian*, a dramatic opera. 3. *Masque in the Opera of the Prophets*. 4. *Revenge*, a comedy. 5. *Unjust Judge*, a tragedy. 6. *Woman made a Justice*, a comedy.

As an *actor*, he was certainly one of the greatest of either his own or any other age; but those who are desirous of having him painted out in the most lively colours to their imagination, we must refer to the description given of him by his cotemporary and friend Colley Cibber, in the *Apology* for his own life. And as a *man*, it is scarcely possible to say more, and it would be injustice to say less, than that he was as unblemished a pattern of private and social virtues, as he was a perfect model of theatrical action and dramatic execution.

BETUE, or BETAW, a territory of the Low Countries in the duchy of Guelderland, between the rivers Rhine and Leck. The ground is very moist, and the rains often render the roads impassible. It is divided into the Upper and Lower.

BETULA, the BIRCH-TREE; a genus of the tetrandria order, belonging to the monœcia class of plants.

Species. 1. The alba, or common birch-tree, is so well known as to need no description. 2. The nana, or dwarf-birch, with roundish leaves, grows naturally in the northern parts of Europe, and on the Alps. It seldom rises above two or three feet high, having slender branches garnished with round leaves, but seldom produces flowers here. It is preserved in some curious gardens for the sake of variety, but is a plant of no use. 3. The lenta, with oblong, pointed, heart-shaped, sawed leaves. 4. The nigra, or black Virginia birch-tree. Both these are natives of North America. In Canada they grow to a large size, and the third sort is there called *merisfer*. 5. The alnus, or alder-tree. Of this there are two varieties, one with round leaves, and the other with long ones.

Culture. The first sort is not much esteemed for its wood; but, however, may be cultivated to advantage upon barren land where better trees will not thrive; for there is no soil so bad but this tree will thrive in it. It will grow in moist springy land, or in dry gravel or sand where there is little surface; so that upon ground which produced nothing but moss, these trees have been known to succeed so well as to be fit for cutting in ten years after they were planted. The best method

of raising these trees is, to procure the young plants from the woods where they naturally grow, and where they are usually found in great plenty; but in places where these young plants cannot be procured, they may be raised from seeds, which should be carefully gathered in the autumn as soon as the scales under which they are lodged begin to open, otherwise they will soon fall out and be lost. The seeds are small, so should not be buried deep in the ground. The best time for sowing them is in the autumn in dry ground, and the spring in moist. The plants will thrive better in a shady situation than if exposed to the sun. If the wild plants are used, they ought to be taken up carefully, so as not to injure their roots. The ground where they are to be planted requires no preparation; all that is necessary to be done is to loosen the soil with a spade or mattock in the places where the plants are to stand, making holes to receive their roots, covering them again when the plants are placed, and closing the earth hard to their roots. If the plants are young, and have not much top, they will require no pruning; but where they have bushy heads, they should be shortened to prevent their being shaken and displaced by the wind. When the plants have taken root, they will require no other care but to cut down the great weeds which would overhang them. This need not be repeated oftener than twice in a summer the first two years; after which the plants will be strong enough to keep down the weeds, or at least be out of danger from them. These trees may be planted any time from the middle of October to the middle of March when the ground is not frozen. They ought to be planted four feet distance from each other, that they may soon cover the ground, and by standing close they will draw one another up. If the plants take kindly to the ground, they will be fit to cut in about ten years; and afterwards they may be cut every seventh or eighth year if designed for the broom-makers only; but if designed for hoops, they should not be cut oftener than every twelfth year. The nana, lenta, and nigra, are to be propagated in the same manner; but the alder may be propagated either by layers, or planting truncheons about three feet high. The best time for this is in February, or the beginning of March. They should be sharpened at one end, and thrust at least two feet deep in the ground, to prevent their being blown out of it after they have made strong shoots. The best time for laying down the branches is in the month of October, and they may be transplanted in October following.

Uses. In some of the northern parts of Europe the wood of the birch is much used for making carriages and wheels, being hard and of long duration. In France it is generally used for making wooden shoes, and in Britain for making womens shoe-heels, packing-boxes, brooms, hoops, &c. It also makes very good fuel, and is planted along with hazel to make charcoal for forges. The bark of the birch tree seems in a manner incorruptible. In Sweden the houses are covered with it, and it lasts many years. It frequently happens that the wood is entirely rotten, when the bark is perfectly sound and good. In Kamtschatka it is used for making drinking cups. It abounds with a refinous matter, to which its durability is certainly owing. In consequence of this matter, it is highly inflammable; and in the northern countries torches are made of this

Betula
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Bevelling.

bark sliced and twisted together. The bark itself consists of two different substances; a thick brittle brownish red one; and several very thin, smooth, white, transparent membranes. In these last the inflammable property resides. The thick brittle part is less resinous, and has a roughish taste. It has been thought to possess some medical virtues, but concerning these experience has as yet determined nothing certain. Upon deeply wounding or boring the trunk of the tree in the beginning of spring, a sweetish juice issues forth, sometimes, as is said, in so large quantity as to equal the weight of the whole tree and root; one branch will bleed a gallon or more in a day. This juice is recommended in scorbutic disorders, and other foulnesses of the blood; its most sensible effect is to promote the urinary discharge. By proper fermentation with the addition of sugar, this juice makes a pleasant wine. The birch-tree is said to be prejudicial to pasturage.

The *alder tree* flourishes best in low marshy situations, in which it is frequently planted to make hedges, and is also of great use for securing the banks of rivers. Grass grows well beneath its shade: the wood is soft and brittle; but lasts a long time under water, and consequently is of use for pipes, and to lay under the foundations of buildings situated upon bogs: womens shoe-heels, ploughman's clogs, and various articles of the turner kind, are made of it. The bark gives a red colour, and with the addition of copperas a black: it is chiefly used by fishermen to stain their nets. In the Highlands of Scotland near Dundonnell, Mr Pennant says the boughs cut in the summer, spread over the fields, and left to rot in the winter, are found to answer as a manure. In March, the ground is cleared of the undecayed parts, and then ploughed. The fresh gathered leaves are covered with a glutinous liquor; and some people strew them on their floors to kill fleas. These insects are said to be entangled in the glutinous liquor of the leaves, as birds are by birdlime. The whole plant is astringent, and its bark has been recommended in intermittent fevers. Horses, cows, goats, and sheep, eat all the species of betula; but swine refuse them.

BETULEIUS (Sixtus), an able grammarian, a good Latin poet, and philosopher, born at Memmingen, in the year 1500; his true name was *Birek*. He taught the belles lettres and philosophy with reputation; and became principal of the college of Angsburg, where he died on the 16th of June, 1554. He published several works in prose; and his dramatic pieces of Joseph, Susannah, and Judith, are esteemed.

BEVECUM, a town of the Austrian Netherlands, in the province of Brabant. E. Long. 4. 50. N. Lat. 50. 45.

BEVEL, among masons, carpenters, &c. a kind of square, one leg whereof is frequently crooked, according to the sweep of an arch or vault. It is moveable on a centre, and so may be set to any angle.

BEVEL-Angle, any other angle besides those of 90 or 45 degrees. See ANGLE.

BEVELAND (North and South), two islands in the province of Zealand, between the eastern and western branches of the river Scheld, making part of the United Provinces.

BEVELLING, in ship-building, the art of hewing a timber with a proper and regular curve, accord-

ing to a mould which is laid on one side of its surface. 'In order to hew any piece of timber to its proper bevel, it will be necessary, first, to make one side *fair* and *out of winding*; a term used to signify that the side of a timber should be a plane. If this side be uppermost, and placed horizontally, or upon a level, it is plain, if the timber is to be hewed square, it may be done by a plummet and line; but if the timber is not hewed square, the line will not touch both the upper and lower edge of the piece; or if a square be applied to it, there will be wood wanting either at the upper or lower side. This is called *within* or *without* a square. When the wood is deficient at the under-side, it is called *under-bevelling*; and when it is deficient on the upper-side, it is called *standing-bevelling*; and this deficiency will be more or less according to the depth of the piece; so that before the proper bevellings of the timbers are found, it will be sometimes very convenient to assign the breadth of the timbers; nay, in most cases it will be absolutely necessary, especially afore and abaft: tho' the breadth of two timbers, or the timber and room, which includes the two timbers and the space between them, may be taken without any sensible error, as far as the square body goes. For as one line represents the moulding-side of two timbers, the fore-side of the one being supposed to unite with the aft-side of the other; the two may be considered as one entire piece of timber.' *Murray's Ship-building.*

BEVERAGE, in a general sense, signifies a *drink*. Hence nectar is said to be the beverage of the gods. In writers of the middle age, beverage, *beveragium*, or *biberagium*, denotes money given to an artificer, or other person, to drink, over and above his hire or wages.

BEVERIDGE (William), a learned English bishop, in the beginning of the 18th century, was born in the year 1638, and educated in St John's college, Cambridge, where he distinguished himself very early by his extensive learning, and particularly by his knowledge of the oriental languages. Upon the deprivation of Dr Thomas Ken, bishop of Bath and Wells, for not taking the oaths to the government in 1691, he refused the offer of that see, tho' he was then chaplain to king William and queen Mary. In 1704 he was consecrated to the bishopric of St Asaph; in which high function he so behaved himself all along, and discharged it in so exemplary a manner, that he approved himself a truly primitive prelate. He died at his lodgings in the Cloisters in Westminster-abbey, in 1707, aged 71. As his whole life was spent in acts of piety and charity, so he gave remarkable instances of both at his death, leaving the bulk of his estate for the propagation of the gospel, and promoting of Christian knowledge, at home as well as abroad. His *Private Thoughts* upon a Christian Life, is deservedly a very popular book. He wrote several other useful and learned works on various subjects, particularly on the oriental tongues.

BEVERLAND (Hadrian), a man of excellent genius in the end of the 16th century, but who prostituted it in the study and composition of books of a very obnoxious kind. He was a perfect master of Ovid, Catullus, Petronius, and authors of that stamp. He is famous for his book on Original Sin, in which he maintained, that Adam's sin consisted in his commerce with his wife, and that original sin is nothing else but the inclination of the sexes to each other: it was

con-

condemned to be buint. He led a scandalous life, but seems to have repented of his wicked manners and lewd writings; for he published a treatise in the end of his life, *De Fornicatione cavenda*, in 1698. It is said he died mad.

BEVERLEY, a town of Yorkshire, governed by a mayor, a recorder, 12 aldermen, &c. and sends two members to parliament. The minster here is a very fair and neat structure, and the roof is an arch of stone; in it are several monuments of the Percies, earls of Northumberland, who had added a little chapel to the choir, in the windows whereof there are several pictures of that family painted on glass; at the upper end of the choir, at the right of the altar-place, stands the freed-stool, made of one entire stone, to which every one that fled had a right of protection; at the upper end of the body of the church, next the choir, hangs an ancient table, with the picture of king Athelstane, who founded the church; between them is this inscription:

Als free make I thee,
As heart can with, or egh can see.

Hence the inhabitants pay no toll in any town or port in England. In the body of the church stands an ancient monument, called the *virgin's tomb*, because two virgin-sisters lie buried there, who gave the town a piece of land, into which any free man may put three milk cows from Lady-day to Michaelmas; at the lower end of the body of the church is a large font of agate stone.

Near the minster, on the south side of it, is a place called *Hall-Garth*, wherein they keep a court of record, called *Provoost's court*; in this causing arising within the liberties may be tried for any sum. The liberties contain above 100 towns and parts of towns, in Holderness and other parts of the east-riding belonging to it. The town is a mile in length, having pleasant springs running quite through it. It is beautified with two stately churches; and has a free-school, with two fellowships, six scholarships, and three exhibitions in St John's college, Cambridge, belonging to it; besides six alms-houses, where none are admitted but those that give bond to leave their effects to the poor when they die. The principal trade of this town is making malt, oat-meal, and tanned leather; and the poor people chiefly support themselves by making bone-lace. About a mile east from the town, there is a mineral water, which cures eruptions of the skin, and is beneficial in the king's evil. E. Long. o. 9. N. Lat. 53. 50.

BEVERLY (John of), in Latin *Joannes Beverlacius*, archbishop of York in the eighth century, was born of a noble family, at Harpham, in Northumberland, and was justly esteemed one of the best scholars of his time. He was first a monk, and afterwards abbot of the monastery of St Hilda, when his merit recommended him to the favour of Alfred king of Northumberland, who, in the year 685, advanced him to the see of Haguitald, or *Hesham*, and, in 687, translated him to the archbishopric of York. This prelate was tutor to the famous Bede; and lived in the strictest friendship with Acca and other Anglo-Saxon doctors, several of whom he engaged to write comments on the Holy Scriptures. In 704, he founded a college at Beverly, for secular priests; and after he had governed the see of York 34 years, being tired of the

tumults and confusions that prevailed in the church, divested himself of his episcopal character, and retired to Beverly; where he died four years after, on the 7th of May, 721.—Bede and other monkish writers ascribe several miracles to him. Between 300 and 400 years after his death, his body was taken up by Alfric archbishop of York, and placed in a shrine richly adorned with silver, gold, and precious stones: and in 1416, the day of his death was, by a synod held at London, appointed a festival. We are told that William the Conqueror, when he ravaged Northumberland with a numerous army, spared Beverly alone, out of a religious veneration for St John of that place. This prelate wrote some pieces, which are mentioned by Bale and Pits, viz. 1. *Pro Luca exponenda*. 2. *Homiliæ in Evangelia*. 3. *Epistolæ ad Hildam Abbatissam*. 4. *Epistolæ ad Heribaldum, Andanum, et Bertinum*.

BEVERUNGEN, a town of Germany, in the diocese of Paderborn, seated at the confluence of the rivers Beve and Weser, in E. Long. 9. 30. N. Lat. 51. 40.

BEVILLE, in heraldry, a thing broken or opening like a carpenter's rule: Thus we say, he beareth argent, a chief beville, vert, by the name of *beverlis*.

BEVIN (Elway), a musician eminently skilled in the knowledge of practical composition, flourished towards the end of queen Elizabeth's reign. He was of Welsh extraction, and had been educated under Tallis, upon whose recommendation it was that, in 1589, he was sworn in, gentleman extraordinary of the chapel; from whence he was expelled in 1637, it being discovered that he adhered to the Romish communion. He was also organist of Bristol cathedral, but forfeited that employment at the same time with his place in the chapel. Child, afterwards doctor, was his scholar. He has composed sundry services, and a few anthems.

Before Bevin's time the precepts for the composition of canon were known to few. Tallis, Bird, Waterhouse, and Farmer, were eminently skilled in this most abstruse part of musical practice. Every canon as given to the public, was a kind of enigma. Compositions of this kind were sometimes exhibited in the form of a cross, sometimes in that of a circle: there is now extant one resembling a horizontal sun-dial; and the *resolution* (as it was called) of a canon, which was the resolving it in to its elements, and reducing it into score, was deemed a work of almost as great difficulty as the original composition: but Bevin, with a view to the improvement of students, generously communicated the result of many years study and experience in a treatise which is highly commended by all who have taken occasion to speak of it. This book was published in 4to, 1631, and dedicated to Goodman bishop of Gloucester, with the following title: 'A briefe and short instruction of the art of musike, to teach how to make discant of all proportions that are in use: very necessary for all such as are desirous to attain to knowledge in the art; and may by practice, if they can sing, soone be able to compose three, four, and five parts, and also to compose all sorts of canons that are usuall, by these directions of two or three parts in one upon the plain song.' The rules contained in this book for composition in general are very brief; but for the composition of canon there are in it a great variety of examples of almost all the possible forms in which it is

Beverungen
|
Bevin.

Hawkins's
Hist. of
Musik.

capa-

Bewdly
||
Beza.

capable of being constructed, even to the extent of 60 parts.

BEWDLY, a town of Worcestershire in England, seated on the bank of the river Severn, in W. Long. 2. 20. N. Lat. 52. 25. It has its name *Bewdley*, *Beawley*, or *Beaulieu*, from its pleasant situation on the declivity of a hill overlooking the river, and commanding a fine prospect of the country, and formerly of the forest of Wyre, remarkable for its tall stately oaks and other trees, which have since been either blown or cut down. It was formerly accounted to delightful a place, that Henry VII. built a house here for prince Arthur, which he called *Tiken-hall*. Bewdley sent burgesses to parliament very early, and had charters and great privileges from Edward IV. and Henry VII. which were confirmed, with the addition of others, by Henry VIII. in whose time it was annexed to the county of Worcester. King James I. granted it a charter; of which a surrender was procured in Charles II.'s time, and the corporation was new-modelled. King James II. compelled it to accept of a new charter; but the former surrender, upon a trial, was held void, and a new charter was obtained of queen Anne. In consequence of this it is governed by a bailiff and burgesses, recorder, steward, town-clerk, &c. The town is neat and well built; and carries on a considerable trade, by means of the Severn, in salt, glass, iron ware, and Manchester goods; but its chief manufacture is in caps, commonly called *Monmouth caps*. It has a good market for corn, malt, leather, and hops.

BEWITS, in falconry, pieces of leather, to which a hawk's bells are fastened, and buttoned to his legs.

BEY, among the Turks, signifies a governor of a country or town. The Turks write it *begh*, or *bek*, but pronounce it *bey*.

This word is particularly applied to a lord of a banner, whom, in the same language, they call *sangiac beg* or *bey*. Every province in Turkey is divided into seven sangiacs, or banners, each of which qualifies a bey; and these are all commanded by the governor of the province, whom they also call *begler-beg*, that is, lord of all the begs or beys of the province: these beys are much the same as bannerets were formerly in England.

BEY of *Tunis*, the same with the dey of Algiers, is the prince or king of that kingdom.

BEYS (Giles), a celebrated printer at Paris, in the 16th century, and the first introducer of the consonants j and v.

BEZA (Theodore),* one of the principal pillars of the reformed church, was born at Vezelai, in Burgundy, June 24th, 1519. He was brought up by his uncle Nicholas de Beza, counsellor of the parliament of Paris, till the month of December, 1528, when he sent him to study at Orleans, and afterwards at Bourges, where he was under the care of Melchior Wolmar, under whom he made an extraordinary progress in polite learning, and from him imbibed the principles of Calvinism. His uncle intended him for the bar; but the law not suiting his disposition, he spent most of his time in reading the Greek and Latin authors, and in composing verses. In 1539, he took up his licentiate's degree, and went to Paris. He fell into snares in his youth, and wrote some licentious things. Sickness awakened him; and he pursued a

vow he had formerly made, of entering into the reformed religion. According to this resolution he went to Geneva, and made public profession of the reformed religion. In 1549, he accepted of the Greek professorship at Lausanne, where he also read lectures in French on the New Testament to the refugees of both sexes who dwelt in that city. Having settled at Geneva, he adhered to Calvin in the strictest manner, and became in a little time his colleague in the church and in the university. He was sent to Nérac, at the solicitation of some great men of the kingdom, to convert the king of Navarre, and to confer with him upon affairs of importance. This was when the Guises had got the authority under the reign of Francis II. to the prejudice of the princes of the blood. The king of Navarre having testified, both by letters and deputies, that he desired that Beza might assist at the conference of Poissy, the senate of Geneva consented. The assembly hearkened attentively to his harangue, till, speaking of the real presence, he said, that the body of Jesus Christ was as distant from the bread and wine, as the highest heaven is from the earth. This made a murmur: some cried out, *Blasphemavit!* others got up to go away. Cardinal de Tournon, who sat in the first place, desired the king and queen either to silence Beza, or to permit him and his company to withdraw. The king did not stir, nor any of the princes, and leave was given to go on. Throughout the whole conference he behaved himself with great ability. He often preached before the queen of Navarre, the prince of Conde, and in the suburbs of Paris. After the massacre of Vassy, he was deputed to the king to complain of this violence. The civil war followed soon after, during which the prince of Conde kept him with him; and while the prince was imprisoned, he lived with admiral de Coligni, and did not return to Geneva till after the peace, 1563. In 1571, he was chosen moderator at the national synod of Rochelle; and the year after, assisted at that of Nismes; after this, he assisted at the conferences of Montheliard, and at those of Bern. The infirmities of old age beginning to fall heavy upon him in 1597, he could seldom speak in public; and at last he left it off entirely in the beginning of the year 1600. However, in 1597, he wrote some animated verses against the Jesuits, on occasion of the report that was made of his death, and of his having before he died made profession of the Roman faith. He lived till the 13th of October, 1605. He was a man of extraordinary merit, and one who did great services to the Protestant cause. This, however, exposed him to innumerable slanders and calumnies; but he shewed both to the Catholics and Lutherans, that he understood how to defend himself. He wrote, 1. A Translation of the New Testament; 2. Turned the Psalms into Latin verse; 3. Published a Treatise on the Sacraments; 4. Some Sermons on the Passion of Jesus Christ and on Solomon's Song; 5. A Version of the Canticles, in lyric verse; 6. A French tragi-comedy, intitled, *The Sacrifice of Abraham*; and many other pieces.

BEZANS, cotton cloths, which come from Bengal; some are white, and others striped with several colours.

BEZANTLER, the branch of a deer's horns next below the brow-antler.

BEZOAR, in natural history and medicine, a general name for certain animal-substances supposed to be effectual in preventing the fatal consequences of poison. The word comes from the Persian *badzcher*, *bazcher*, or *pabazar*, which signifies an antidote.

The first mention made of bezoar is in Avenzoar, an Arabian physician, who gives a very romantic account of its origin. He describes it as generated of the tears or gum of the eyes of stags; who, after eating serpents, used to run into the water up to the nose, where they stood till their eyes began to ooze a humour, which, collecting under the eyelids, gradually thickened and coagulated, till, being grown hard, it was thrown off by the animal in rubbing frequently. Other opinions no less fabulous obtained till the time of Garcias al Horto, physician to the Portuguese viceroy of the Indies, who gave the first genuine account of it. Kempfer afterwards gave a description of it, with some new particulars.

The bezoar is a calculus concretion found in the stomach of certain animals of the goat kind *. It is composed of concentric coats surrounding one another, with a little cavity in the middle, containing a bit of wood, straw, hair, or the like substances.

There are two sorts of bezoar; one brought from Persia and the East Indies, the other from the Spanish West Indies. The first or best sort, called *oriental bezoar*, is of a shining dark-green or olive colour, and an even smooth surface; on removing the outward coat, that which lies underneath it appears likewise smooth and shining. The *occidental* has a rough surface, and less of a green colour than the foregoing; it is likewise much heavier, more brittle, and of a looser texture; the coats are thicker, and on breaking exhibit a number of stræ curiously interwoven. The oriental is generally less than a walnut; the occidental for the most part larger, and sometimes as big as a goose egg. The first is universally most esteemed, and is the only sort now retained by the London college: the Edinburgh, in the edition of their pharmacopœia preceding the present, directed both; but they now seem to allow them to be used promiscuously, retaining in their catalogue only the name *bezoar lapis*.

This stone is in high esteem among the Persians, and even of greater value than in Europe; which, with sundry other circumstances needs to relate here, has given occasion to many to suspect, that the true bezoar is never brought to us. Some authors relate with great confidence, that all the stones commonly sold under this name are artificial compositions. That some of them are so, is evident; hence the great differences in the accounts which different persons have given of their qualities: the stones examined by Slare as oriental bezoar did not dissolve in acids; those which Grew and Boyle made trial of, did; those employed by Geoffroy (in some experiments related in the French memoirs 1710) did not seem to be acted on by rectified spirit; whilst some of those examined by Neumann at Berlin almost totally dissolved therein. The common mark of the goodness of this stone, is its striking a deep green colour on white paper that has been rubbed with chalk.

Bezoar was not known to the ancient Greeks, and is first taken notice of by the Arabians, (as above mentioned), who extol it in a great variety of disorders, particularly against poisons. Later writers also bestow

extraordinary commendations on it as a sudorific and alexipharmac; virtues to which it certainly has no pretence. It has no smell or taste, is not digestible in the stomach of the animal in which it is found, and is scarce capable of being acted on by any of the juices of the human body. It cannot be considered in any other light than as an absorbent; and is much the weakest of all the common substances of that class. It has been given to half a dram, and sometimes a whole dram, without any sensible effect; though the general dose (on account of its great price) is only a few grains.

BEZOAR, in a more extensive sense, includes all substances formed stratum super stratum in the stomachs or intestines of animals; in which sense pearls, the concretions called *crabs-eyes*, &c. belong to the class of bezoars. To this also belong the lippolithus, or *bezoar equinum*, a stone sometimes found in the stomach or intestines of a horse; the monkey-bezoar, a stone said to be found in the stomachs of certain monkeys in Brazil and the East Indies, harder than the oriental bezoar, of a dark-green colour, and very costly on account of its scarcity.—*Bezoar bovinum*, is a yellowish stone found in the ox's gall-bladder.—*Human bezoars* are stony substances found in the intestines of several persons, formed from the stones of plums, or other fruits, retained in the œcum or other guts, and growing coated over, of which we have an instance given by Dr Cole, Phil. Trans. n° 235.—*Bezoar microscopium* is the same with the human calculus; and is various in its degrees of hardness, as well as in its size and figure. It has been used in the place of the more costly foris.—As to the *bezoar hystricis*, a concretion found in the gall-bladder of an Indian porcupine; and the German bezoar, or that found in mountain-deer, especially on the Alps; these, not being stones, are more properly called by late writers *agagopile* *; the former consisting of woolly fibres, and a bitter friable matter, having neither laminae nor membranes; the latter being a ball of hair or herbs, or perhaps roots, compacted in the stomach of the animal.—They are all, as medicines, unworthy of regard. The bezoar bovinum, or ox-bezoar, is used by miniature-painters in several casts of yellow. ©

BEZOAR-mineral. See PHARMACY, n° 794.—From this preparation, mixed with other metals various ways, arise other compound bezoardics; as, the bezoardicum solare, lunale, martiale, joviale, &c. or bezoar with gold, with silver, with iron, with tin, &c. in disrepute. The last differs very little from the *antihelcticum Poterii*, an exploded medicine.

Fossil BEZOAR, is a kind of figured stone, formed, like the animal bezoar, of several coats or strata ranged round some extraneous body which forms a nucleus, and supposed to have the same virtues. It is found chiefly in Sicily, in sand and clay pits. It is of a purple colour, with a rough surface, the size of a walnut, and light. When broken, it is found to be an iron crust, containing in its hollow a fine greenish white earth resembling pale bezoar. The earth is used, and not the shells. It seems to be of the nature of bole armeniac. It is also called *Sicilian earth*.

BEZOARDIC, an appellation given to whatever partakes of the nature of bezoar; also to compound medicines whereof bezoar makes an ingredient.

BEZOARDIC Powder. See PHARMACY, n° 814.

Bezoar
Bezoar

* See *Agapile*.

MA.

Tia
||
Bias.

† See *Cu-
ries.*

BIA, in commerce, a name given by the Siamefe to those small shells which are called *cowries* throughout almost all the other parts of the East Indies †.

BLÆUM, *blæus*, in rhetoric, denotes a kind of counter-argument, whereby something alleged for the adversary is retorted against him, and made to conclude a different way: for instance, *Occidisti, quia adfististi interfecisti.*—*Blæus.* Immo quia adfististi interfecisti, non occidi; nam si id esset, in fugam me conjecissem. “You killed the person, because you were found standing by his body. *Blæum*, Rather I did not kill him because I was found standing by his body; since, in the other case, I should have fled away.”

BLÆUM, in the Grecian laws, was an action brought against those who ravished women, or used violence to any man's person.

BIAFAR, or **BIAFRA**, a kingdom of Africa, situated to the east of Benin, to the west of Medra, from which it is divided by a chain of mountains, and extending southward to the fourth degree of north latitude. The natives are the most of all negroes addicted to, and infatuated with, magic; imagining themselves capable of causing rain, thunder, and lightning: therefore they worship the devil with great zeal, and even sacrifice their children to him.

BIAFORA, in the customs of the middle age, a form of cry, or alarm to arms; on the hearing whereof, the inhabitants of towns or villages were to issue forth, and attend their prince. The word seems originally from Gascony; and the Italians even now, on a sudden insurrection of the people, commonly cry, *Via-fora*, by a usual change of the letter B into V.

BIARCHUS, an officer in the court of the emperors of Constantinople, intrusted with the care and inspection of the provisions of the soldiery.

BIALOGOROD, or **AKERMAN**, a strong town of Bessarabia, in European Turkey. It is seated on a lake called *Vidono*, near the sea side; in E. Long. 22. 50. N. Lat. 46. 24.

BIANA, a town of Asia in the dominions of the Great Mogul, remarkable for its excellent indigo. E. Long. 77. 0. N. Lat. 26. 20.

BIANCHINI (Francis), one of the most learned men of his time, was born at Verona, in 1662, of a noble and ancient family. His taste for natural philosophy and mathematics induced him to establish the academy of *Aletosili*, at Verona. He went to Rome in 1684; and was made librarian to cardinal Ottoboni, who was afterwards Pope under the name of Alexander VIII. He also became canon of St Mary de la Rotonda, and at length of St Lawrence in Damaso. He was esteemed by the learned; and was a member of many academies. He published several ingenious dissertations, &c. and died in 1729, aged 67.

BIAS, one of the seven sages of Greece, flourished about 608 before Christ. He was accustomed to say, “It is a sickness of the mind to wish for impossible things.” During the siege of Priena, his native city, being asked why he was the only one who retired from the place without carrying any thing with him, he replied, that he carried his all with him; meaning, that his knowledge and virtue were the only blessings that were peculiarly his own, since they could not be taken from him. He expired while pleading for one of his friends.

BIAS, or *Biafi*, in a general sense, the inclination or bent of a person's mind to one thing more than another.—It also signifies the lead or weight put into a bowl, that draws or turns the course of it any way to which the bias looks.

BIBERACH, a free and imperial city of Suabia in Germany. It has a large manufacture in fustians, and is seated in a pleasant fertile valley on the river Rufs. E. Long. 10. 2. N. Lat. 48. 4.

BIBERSBERG, a town of Upper Hungary, situated in E. Long. 17. 25. N. Lat. 48. 35.

BIBIENA (Ferdinand Galli), an excellent painter and architect, was born at Bologna, in 1657; and was furnished *Bibiena* from a territory of that name in Tuscany, in which his father was born. He acquired such reputation by his skill in architecture, the decorations of the theatre, and perspective, that the duke of Parma invited him to his court, and made him his first painter and architect. Bibiena at length went to the emperor's court, where he had the same honours and advantages. He wrote two books of architecture; and died at Bologna, at above 80 years of age. His sons followed, with success, the same professions.

BIBLE, (in Greek *βιβλος*, the book), a name applied by Christians, by way of eminence or distinction, to the collection of sacred writings, or the holy scriptures of the Old and New Testaments; known also by various other appellations, as, the Sacred Books, Holy Writ, Inspired Writings, Scriptures, &c. The Jews styled the Bible (that is, the Old Testament) *mikra*; which signifies *Lesson*, or *Lecture*.

This collection of the sacred writings, containing those of the Old and New Testament, is justly looked upon as the foundation of the Jewish as well as the Christian religion. The Jews, it is true, acknowledged only the scriptures of the Old Testament, the correcting and publishing of which is unanimously ascribed, both by the Jews and Christians, to Ezra. Some of the ancient fathers, on no other foundation than that fabulous and apocryphal book, the second book of *Eldras*, pretend, that the scriptures were entirely lost and destroyed at the Babylonish captivity, and that Ezra restored them all again by divine revelation. What is certain is, that in the reign of Josiah there was no other book of the law extant besides that found in the temple by Hilkiah; from which original, by order of that pious king, copies were immediately written out, and search made for all the other parts of the scriptures, (2 Kings xxii.) by which means copies of the whole became multiplied among the people, who carried them with them into their captivity. After the return of the Jews from the Babylonish captivity, Ezra got together as many copies as he could of the Sacred writings, and out of them all prepared a correct edition, disposing the several books in their proper order, and settling the canon of scripture for his time. These books he divided into three parts. 1. The Law. 1. The Prophets. 3. The Cetubim, or Hagiographa, i. e. *The holy writings*.

1. The Law contains. 1. Genesis. 2. Exodus. 3. Leviticus. 4. Numbers. 5. Deuteronomy.

II. The writings of the prophets are. 1. Joshua. 2. Judges, with Ruth. 3. Samuel. 4. Kings. 5. Isaiah. 6. Jeremiah, with his Lamentations. 7. Ezekiel. 8. Daniel. 9. The twelve minor Prophets.

10. Job. 11. Ezra. 12. Nehemiah. 13. Esther.
 III. And the Hagiographia consists of, 1. The Psalms. 2. The Proverbs. 3. Ecclesiastes. 4. The Song of Solomon. This division was made for the sake of reducing the number of the sacred books to the number of the letters in their alphabet, which amount to 22. At present, the Jews reckon 24 books in their canon of scripture, in disposing of which the law stands as it did in the former division, and the prophets are distributed into the former and latter prophets.

The former prophets are,
 Joshua, Judges, Samuel, Kings.

The latter prophets are,
 Isaiah, Jeremiah, Ezekiel, and the 12 minor prophets.

And the hagiographia consists of,
 The Psalms, the Proverbs, Job, the Song of Solomon, Ruth, the Lamentations, Ecclesiastes, Esther, Daniel, Ezra, the Chronicles.

Under the name of Ezra, they comprehend Nehemiah. It is true this order hath not always been observed; but the variations from it are of little or no moment.

The five books of the law are divided into 54 sections. This division many of the Jews hold to have been appointed by Moses himself; but others, with more probability, ascribe it to Ezra. The design of this division was, that one of these sections might be read in their synagogues every sabbath-day. The number was 54, because in their intercalated years, a month being then added, there were 54 sabbaths. In other years, they reduced them to 52, by twice joining together two short sections. Till the persecution of Antiochus Epiphanes, they read only the law; but the reading of it being then prohibited, they substituted in the room of it 54 sections out of the Prophets; and when the reading of the law was restored by the Maccabees, the section which was read every sabbath out of the law served for their first lesson, and the section out of the prophets for their second. These sections were divided into verses, of which division, if Ezra was not the author, it was introduced not long after him, and seems to have been designed for the use of the Targumists, or Chaldee interpreters; for after the return of the Jews from the Babylonish captivity, when the Hebrew language ceased to be their mother tongue, and the Chaldee grew into use instead of it, the custom was, that the law should be first read in the original Hebrew, and then interpreted to the people in the Chaldee language, for which purpose these shorter sections or periods were very convenient.

The division of the scriptures into chapters, as we at present have them, is of much later date. Some attribute it to Stephen Langton, archbishop of Canterbury, in the reigns of John and Henry III. But the true author of the invention was Hugo de Sancto Caro, commonly called *Hugo Cardinalis*, because he was the first Dominican that ever was raised to the degree of cardinal. This Hugo flourished about the year 1240. He wrote a comment on the scriptures, and projected the first concordance, which is that of the vulgar Latin bible. The aim of this work being for the more easy finding out any word or passage in the scriptures, he found it necessary to divide the book into sections, and the sections into subdivisions; for till that time the vulgar Latin Bibles were without any division at all.

These sections are the chapters into which the Bible hath ever since been divided. But the subdivision of the chapters was not then into verses, as it is now. Hugo's method of subdividing them was by the letters A, B, C, D, E, F, G, placed in the margin at an equal distance from each other, according to the length of the chapters. The subdivision of the chapters into verses, as they now stand in our Bibles, had its original from a famous Jewish rabbi, named Mordecai Nathan, about the year 1445. This rabbi, in imitation of Hugo Cardinalis, drew up a concordance to the Hebrew Bible, for the use of the Jews. But though he followed Hugo in his division of the books into chapters, he refined upon his invention as to the subdivision, and contrived that by verses: this being found to be a much more convenient method, it has been ever since followed. And thus, as the Jews borrowed the division of the books of the holy scriptures into chapters from the Christians, in like manner the Christians borrowed that of the chapters into verses from the Jews.

The order and division of the books of the Bible, as well of the Old as the New Testament, according to the disposition made by the council of Trent, by decree I. session iv. are as follow; where we are to observe, that those books to which the asterisks are prefixed, are rejected by the Protestants, as apocryphal *.

* See Apocrypha.

Genesis,
 Exodus,
 Leviticus,
 Numbers,
 Deuteronomy,
 Joshua,
 Judges and Ruth,
 1 Samuel, or 1 Kings,
 2 Samuel, or 2 Kings,
 1 Kings, otherwise called iii. Kings,
 2 Kings, otherwise called iv. Kings,
 1 Chronicles,
 2 Chronicles,
 1 Esdras, (as the LXX and Vulgate call it), or the book of Ezra,
 2 Esdras, or (as we have it) the book of Nehemiah,
 * Tobit,
 * Judith,
 Esther,
 Job,
 Psalms,
 Proverbs,
 Ecclesiastes,
 Song of Solomon,
 * The book of Wisdom,
 * Ecclesiasticus,
 Isaiah,
 Jeremiah and * Baruch,
 Ezekiel,
 Daniel,
 Hosea,
 Joel,
 Amos,
 Obadiah,
 Nahum, which we place immediately after Micah, before Habakkuk.
 Jonah, which we place immediately after Obadiah.
 Micah,

Bible.

Habakkuk,
Zephaniah,
Haggai,
Zechariah,
Malachi,
* 1 Maccabees,
* 2 Maccabees.

The books of the New Testament are,

The Gospel of	{	St Matthew,	
		St Mark,	
		St Luke,	
		St John.	
The acts of the Apostles,	{	the Romans,	
		the Corinthians, I.	
The Epistle of St Paul to	{	the Corinthians, II.	
		the Galatians,	
		the Ephesians,	
		the Philippians,	
		the Colossians,	
		the Thessalonians, I.	
		the Thessalonians, II.	
		Timothy, I.	
		Timothy, II.	
		Titus,	
		Philemon,	
		The general Epistle of	{
St James,			
St Peter, I.			
St Peter, II.			
St John, I.			
St John, II.			
St John, III.			
St Jude,			
The Revelations of St John.			

The apocryphal books of the Old Testament, according to the Romanists, are, the book of Enoch (see Jude 14.), the third and fourth books of Esdras, the third and fourth books of Maccabees, the prayer of Manasseh, the Testament of the twelve Patriarchs, the Passalter of Solomon, and some other pieces of this nature.

The apocryphal books of the new Testament are the epistle of St Barnabas, the pretended epistle of St Paul to the Laodiceans, several spurious gospels, Acts of the Apostles, and Revelations; the book of Hermas, intitled the Shepherd, Jesus Christ's Letter to Abgarus, the epistles of St Paul to Seneca, and several other pieces of the like nature, as may be seen in the collection of the apocryphal writings of the New Testament made by Fabricius.

The books which are now lost, and cited in the Old Testament, are these, the book of the *Righteous*, or of Jasher, as our version of the Bible has it, (Josh. x. 13. and 2 Sam. i. 18.); the book of the wars of the Lord, (Numb. xxi. 14.); the annals of the kings of Israel, so often cited in the books of the Kings and Chronicles. The authors of these annals were the prophets, who lived in the kingdoms of Judah and Israel. We have likewise but a part of Solomon's 3000 proverbs, and his 1005 songs, (1 Kings iv. 32.); and we have entirely lost what he wrote upon plants, animals, birds, fishes, and reptiles.

Ezra, in the opinion of most learned men, published the scriptures in the Chaldee character: for that lan-

guage being grown wholly into use among the Jews, he thought proper to change the old Hebrew character for it, which hath since that time been retained only by the Samaritans, among whom it is preserved to this day.

Prideaux is of opinion that Ezra made additions in several parts of the Bible, where any thing appeared necessary for illustrating, connecting, or completing the work; in which he appears to have been assisted by the same spirit in which they were first written. Among such additions are to be reckoned the last chapter of Deuteronomy, wherein Moses seems to give an account of his own death and burial, and the succession of Joshua after him. To the same cause our learned author thinks are to be attributed many other interpolations in the Bible, which created difficulties and objections to the authenticity of the sacred text, no ways to be solved without allowing them. Ezra changed the names of several places which were grown obsolete, and instead of them put their new names, by which they were then called, in the text. Thus it is that Abraham is said to have pursued the kings who carried Lot away captive, as far as Dan; whereas that place in Moses's time was called *Laiß*; the name *Dan*, being unknown till the Danites, long after the death of Moses, possessed themselves of it.

The Jewish canon of Scripture was then settled by Ezra, yet not so but that several variations have been made in it. Malachi, for instance, could not be put in the Bible by him, since that prophet is allowed to have lived after Ezra; nor could Nehemiah be there, since mention is made, in that book, of Jaddus, as high-priest, and of Darius Codomannus, as king of Persia, who were at least 100 years later than Ezra. It may be added, that in the first book of Chronicles, the genealogy of the sons of Zerubbabel is carried down for so many generations as must necessarily bring it to the time of Alexander, and consequently this book could not be in the canon in Ezra's days. It is probable, the two books of Chronicles, Ezra, Nehemiah, Esther, and Malachi, were adopted into the Bible in the time of Simon the Just, the last of the men of the great synagogue.

As the Jews were very backward in having any intercourse with strangers, it was a long time before their sacred books came to be known and read in other nations. Josephus ascribes the little that is said of the Jews by Pagan writers to this, that the latter had no opportunity of being acquainted with their historians, for want of a translation of their books into the Greek language. Arietas indeed pretends, that there was an imperfect version of the Scriptures before the time of Demetrius Phalereus; and that Theopompus intending to insert a part of them in his verses, was deprived of his understanding; but of this there is no proof.

The Jews, upon their return from the Babylonish captivity, having brought with them their Chaldaic or Assyrian language, which from that time became their mother-tongue, gave birth to the Chaldee translations, or rather paraphrases of the Bible, called *Targum* *.

Greek Bible. It is a matter of dispute among authors whether there was a Greek version of the Old Testament more ancient than the Septuagint †.

Before our Saviour's time, there was no other Greek version of the Old Testament, besides that which went under the name of the *Septuagint*: but after the establishment

* See Targum.

† See Septuagint.

blishment of Christianity, some authors undertook new translations, under pretence of making them more conformable to the Hebrew text. The first who performed this design was the Jewish proselyte Aquila, of the city of Synope in Pontus, disciple to Rabbi Akiba, who put it in execution the twelfth year of the emperor Adrian, A. D. 128. St Epiphanius pretends, that being excommunicated after his conversion, for addicting himself to judicial astrology, he set about this version out of hatred to the Christians, and with a wicked design of corrupting the passages of the prophets relating to Jesus Christ. St Jerom says, his version is made word for word, and with too scrupulous a nicety.

The second Greek version after the Septuagint is that of Symmachus, a Samaritan by birth, who first turned Jew, then Christian, and at last Ebionite. He composed it, according to Epiphanius, in the reign of the emperor Severus. His version was more free than the rest; for he applied himself chiefly to the sense, without translating word for word; wherefore his version comes nearer the Septuagint than that of Aquila. The third Greek version is that of Theodotion of Ephesus. It is said he was a disciple of Marcion, and that, having had some difference with those of his sect, he turned Jew. The version of this author was the best of the three, because he kept a just medium between Aquila and Symmachus, not confining himself so servilely to the letter as the first did, nor wandering so far from it as the second did.

There were, besides these, three other Greek versions, whose authors are unknown.

SYRIAC BIBLE. The Syrians have in their language a version of the Old Testament, which they pretend to be of great antiquity. A great part of it, they say, was made in Solomon's time, and the rest in the time of Abgarus king of Edessa. They relate, that Hiram king of Tyre desired Solomon to communicate the use of letters and writing to the Syrians, and to get translated for them the sacred books of the Hebrews; which Solomon complied with, and sent them the Pentateuch, Joshua, Judges, Ruth, Samuel, Psalms, Proverbs, Ecclesiastes, Solomon's Song, and Job, which were the only books then extant; the remaining books of Scripture, they add, were translated into Syriac after the death of Christ, by the care of Abgarus king of Edessa. But this account is looked upon as fabulous. It is true, the Syriac version which we have now must be very ancient, since it is often cited by the fathers. Dr Prideaux is of opinion, it was made within the first century; that the author of it was some Christian of the Jewish nation; and that it is the best translation of the Old Testament. This version is not always agreeable to the original; but in some places is more conformable to the Samaritan Pentateuch, and in some to the version of the Septuagint. In the Psalms, the translator has taken the liberty to leave out the ancient titles and inscriptions of each Psalm, instead of which he gives an abstract of the contents of each Psalm.

LATIN BIBLE. It is past dispute, that the Latin churches had, even in the first ages, a translation of the Bible in their language, which being the vulgar language, and consequently understood by every one, occasioned a vast number of Latin versions. Among all these, there was one which was generally received, and called by St Jerom the *vulgar*, or *common translation*.

St Austin gives this version the name of the *Itala*, and prefers it to all the rest: but we reserve a distinct article for this version. See *VULGATE*.

St Jerom undertook to revise and correct the Latin version of the Bible; but, having afterwards attained to a more perfect knowledge of the Hebrew language, he set about a new translation of some books of the Old Testament from the Hebrew; and continuing, at the solicitation of his friends, to translate the rest, he at last perfected an entire new version of all the books contained in the Hebrew canon. In his translation he followed as nearly as he could the version of the Septuagint, and retained the very expressions of the ancient vulgar Latin; as far as was consistent with purity of style and true Latinity. This translation was so highly applauded by the Christian church, that some authors have pretended it was brought to perfection by the inspiration of the Holy Ghost. But St Augustine looked upon the author to be so well skilled in the Hebrew language, as to be able to undertake and bring to perfection such a work by the strength of his own abilities. St Jerom's version was soon received in many churches; and in the sixth century it became as general, and in as great esteem, as the ancient Vulgate.

It was not till the 16th century that any new Latin translations were made of the Bible from the Hebrew text. Sanctes Pagninus, a Dominican monk, was the first who undertook a new version of the books of Scripture from the modern Hebrew text. His design was encouraged by pope Leo X.; and his version made its first appearance at Lyons in the year 1527. It adheres too scrupulously to the words of the text, which makes it obscure, and favour of barbarity in many places. He is likewise often misled as to the sense, having affected too much to follow the explications of the Jewish Rabbins. It is however a very useful work, and very proper to explain the literal sense of the Hebrew text. Arias Montanus, when he compiled the edition of the *Biblia Polyglotta*, revised this translation of Pagninus.

Cardinal Cajetan, though not versed in the Hebrew, undertook a translation of some parts of the Bible by the assistance of two persons well skilled in that language, the one a Jew, the other a Christian. After him Isidore Clarius, a monk of Mount Cassin, set himself to reform the vulgar version of the Bible after the Hebrew text; in the doing of which, he pretends to have corrected above 8000 passages of the Bible. Besides these translations, made by Catholic authors, there are some likewise performed by Protestant translators; the first of whom was Sebastian Munster. His version is more intelligible, and in much better Latin, than that of Pagninus. Huetius bestows on him the character of a translator well versed in the Hebrew, and whose style is very exact and conformable to the original. The translation of Leo Juda, a Zuinglian, printed at Zurich in 1543, and afterwards by Robert Stephens in 1545, is written in a more elegant style than that of Munster; but he often departs from the literal meaning of the Hebrew text for the sake of an elegant Latin expression. However, in this he has not taken so great a liberty as Sebastian Castalio, who undertook to give the world an elegant Latin version of the Bible: but there are critics who censure him for departing from the noble simplicity and natural grandeur of the original, and deviating into an affected effeminate style.

Bible.

overcharged with false rhetoric, and not always true Latinity. The version of Junius and Tremellius, has much more of the true natural simplicity: the chief Hebraisms are preserved in it, and the whole is strictly conformable to the Hebrew text. We must not forget the version of Theodore Beza, a Protestant divine of Geneva, in the 16th century. Sebastian Castalia found fault with this version, and Beza wrote an apology for it about the year 1564.

Arabic Bible. The Arabic versions of the Bible are of two sorts; the one done by Christians, the other by Jews. There is one of the Old Testament, whose author is supposed to be Saadias Gaon, a Jew of Babylon, who wrote the same about the year of Christ 900. Of this whole work the Pentateuch alone is printed. The Jews have another Arabic version in Hebrew characters, which Erpenius published in Arabic characters at Leyden in the year 1622. Among the Arabic translations done by Christians, there is one printed in the polyglots of Paris and London; but both the author, and the time when it was written, are unknown. It must have been made since the publication of the Koran, because the author in many places has evidently followed it. In this version the Pentateuch is translated from the Hebrew text; Job, from the Syriac; and the rest from the Septuagint, and two other versions of the Pentateuch, the manuscripts of which are in the Bodleian library. There are also some Arabic translations of the Psalms; one printed at Genoa in 1516, the other at Rome in 1619; and there is a manuscript version of the prophets in this language preserved in the Bodleian library.

The gospel being preached in all nations, there is no doubt but that the Bible, which is the foundation of the Christian religion, was translated into the respective languages of each nation. St Chrysostom and Theodoret both testify, that the books of the Old and New Testament had been translated into the Syrian, Egyptian, Indian, Persian, Armenian, Æthiopic, Scythian, and Samaritan languages. Socrates and Sozomen tell us, that Ulphilas bishop of the Goths, who lived about the middle of the fourth century, had translated the holy Scriptures into the Gothic language; and pope John VIII. gave his approbation to the version of the holy Scriptures made into the Slavonian.

Æthiopic Bible. The Æthiopic version of the Old Testament is made immediately from the Greek text of the Septuagint; and there is a very plain agreement between this translation and the Alexandrian manuscript: the order of the chapters, the inscriptions of the Psalms, and every thing else being exactly alike. The Æthiopians attribute this version to Frumentius, the apostle of Æthiopia, sent thither by Athanasius bishop of Alexandria.

Coptic or Egyptian Bible. The Coptic or Egyptian translation is likewise made from the Greek of the Septuagint, in which the Egyptian translator so punctually followed the Greek text, that he refused to make use of the labours of Origen and others, who had been at the pains to compare the Greek version with the Hebrew text. We are quite in the dark as to the author and the time of this version, but probably it is very ancient, since we cannot suppose the Egyptian church was long without a translation of the Scriptures in their mother tongue.

Bible.

Persian and Turkish Bible. There are several versions of the Bible in the Persian language, most of which are in manuscript. There is a translation of the Psalms by one father John, a Carmelite; and another of the same book done from the Latin by the Jesuits. Walton, in the London Polyglot, has published the Gospels, translated by one Simon son of Joseph, a Christian of Persia, who lived in the year 1341. We have likewise some manuscript translations of the Bible in the Turkish language, particularly a version of the New Testament printed at London in the year 1666.

Armenian and Georgian Bible. The Armenians have an old translation of the Scriptures in their language, taken from the Greek of the Septuagint. Three learned Armenians were employed about it, in the time of the emperor Arcadius, viz. Moses surnamed the *Grammarians*, David the Philosopher, and Mampræus. The Armenians, in 1666, procured an edition of the Bible in their language to be made at Amsterdam, under the direction of an Armenian bishop. Another was printed at Antwerp in 1670, by the procurement of Theodorus Patraeus, and the New Testament separately in 1668.

The Georgians have likewise a translation of the Bible in the old Georgian language: but as this language is known only to a very few persons, and the people of the country are extremely ignorant, there is scarce any one who either reads or understands this version.

Whilst the Roman empire subsisted in Europe, the reading of the Scriptures in the Latin tongue, which was the universal language of that empire, prevailed every where. But since the face of affairs in Europe has been changed, and so many different monarchies erected upon the ruins of the Roman empire, the Latin tongue has by degrees grown into disuse: whence has arisen a necessity of translating the Bible into the respective languages of each people; and this has produced as many different versions of the Scriptures in the modern languages, as there are different nations professing the Christian religion. Hence we meet with French, Italian, Spanish, German, Flemish, Danish, Slavonian, Polish, Bohemian, and Russian or Muscovite Bibles; besides the Anglo-Saxon, and modern English and Irish Bibles.

French Bible. The oldest French Bible we hear of is the version of Peter de Vaux, chief of the Waldenses, who lived about the year 1160. Raoul de Priele translated the Bible into French in the reign of Charles V. king of France, about the year 1380. Besides these, there are several old French translations of particular parts of the Scripture. The doctors of Louvain published the Bible in French at Louvain, by order of the emperor Charles V. in 1550. There is a version by Isaac le Maître de Sacy, published in 1672, with explanations of the literal and spiritual meaning of the text, which was received with wonderful applause, and has been often reprinted. As to the New Testaments in French, which have been printed separately, one of the most remarkable is that of F. Amelotte of the oratory, composed by the direction of some French prelates, and printed with annotations in the year 1666, 1667, and 1670. The author pretends he had been at the pains to search all the libraries in Europe, and collate the oldest manuscripts. But, in examining his work, it appears that he has produced no considerable various readings,

ings, which had not before been taken notice of either in the London Polyglott or elsewhere. The New Testament of Mons printed in 1665, with the archbishop of Cambray's permission, and the king of Spain's licence, made a great noise in the world. It was condemned by pope Clement IX. in 1668, and by pope Innocent XI. in 1679, and in several bishoprics of France at several times. The New Testament published at Trevoux in 1702, by M. Simon, with literal and critical annotations upon difficult passages, was condemned by the bishops of Paris and Meaux in 1702. F. Bohours, a Jesuit, with the assistance of F. F. Michael Teller, and Peter Bernier, Jesuits likewise, published a translation of the New Testament in 1697: but this translation is, for the most part, harsh and obscure, which was owing to the author's keeping too strictly to the Latin text from which he translated.

There are likewise French translations published by Protestant authors; one by Robert Peter Olivetan, printed at Geneva in 1535, and since often reprinted with the corrections of John Calvin and others; another by Sebastian Castilio, remarkable for particular ways of expression never used by good judges of the language. John Diodati likewise published a French Bible at Geneva in 1644; but some find fault with his method, in that he rather paraphrases the text than translates it. Faber Stapalenis translated the New Testament into French, which was revised and accommodated to the use of the reformed churches in Piedmont, and printed in 1534. Lastly, M. John Le Clerc published a New Testament in French at Amsterdam in 1703, with annotations taken chiefly from Grotius and Hammond; but the use of this version was prohibited in Holland by order of the States-General, as tending to revive the errors of Sabellius and Socinus.

Italian Bible. The first Italian Bible published by the Romanists, is that of Nicholas Malermi, a Benedictine monk, printed at Venice in 1471. It was translated from the Vulgate. The version of Anthony Brucioli, published at Venice in 1532, was prohibited by the council of Trent. The Calvinists likewise have their Italian Bibles. There is one of John Diodati in 1607 and 1641, and another of Maximus Theophilus in 1551, dedicated to Francis de Medicis duke of Tuscany. The Jews of Italy have no entire version of the Bible in Italian; the inquisition constantly refusing to allow them the liberty of printing one.

Spanish Bible. The first Spanish Bible that we hear of, is that mentioned by Cyprian de Valera, which he says was published about the year 1500. The Epistles and Gospels were published in that language by Ambrose de Montefin in 1512; the whole Bible by Cassiodore de Reyna, a Calvinist, in 1569; and the New Testament, dedicated to the emperor Charles V. by Francis Enzinas, otherwise called *Driander*, in 1543. The first Bible which was printed in Spanish for the use of the Jews, was that printed at Ferrara in 1553, in Gothic characters, and dedicated to Hercules d'Est duke of Ferrara. This version is very ancient, and was probably in use among the Jews of Spain before Ferdinand and Isabella expelled them out of their dominions in 1492.

German Bible. The first and most ancient translation of the Bible in the German language, is that of Ulphilas bishop of the Goths, about the year 360. This

bishop left out the book of Kings, which treat chiefly of war, lest it should too much encourage the martial humour of the Goths. An imperfect manuscript of this version was found in the abbey of Verden near Cologne, written in letters of silver, for which reason it is called *Codex Argenteus*; and it was published by Francis Junius in 1665. The oldest German printed Bible extant, is that of Nuremberg, printed in 1447; but who the author of it was, is uncertain. John Emzer, chaplain to George duke of Saxony, published a version of the New Testament in opposition to Luther. There is a German Bible of John Eckius in 1537, with Emzer's New Testament added to it; and one by Ulemburgius of Westphalia, procured by Ferdinand duke of Bavaria, and printed in 1630. Martin Luther having employed eleven years in translating the Old and New Testament, published the Pentateuch in 1522, the historical books and the Psalms in 1524, the books of Solomon in 1527, Isaiah in 1529, the Prophets in 1531, and the other books in 1530: he published the New Testament in 1522. The learned agree, that his language is pure, and the version clear, and free from intricacies: it was revised by several persons of quality, who were masters of all the delicacies of the German language. The German Bibles which have been printed in Saxony, Switzerland, and elsewhere, are for the most part the same as that of Luther, with very little variation. In 1604, John Piscator published a version of the Bible in German, taken from that of Junius and Tremellius: but his turn of expression is purely Latin, and not at all agreeable to the genius of the German language: the Anabaptists have a German Bible printed at Worms in 1529. John Crellius published his version of the New Testament at Racovia in 1630; and Felbinger his, at Amsterdam, in 1660.

Flemish Bible. The Flemish Bibles of the Romanists are very numerous, and for the most part have no author's name prefixed to them, till that of Nicolas Vinck, printed at Lovain in 1548. The Flemish versions made use of by the Calvinists till the year 1637, were copied principally from that of Luther. But the synod of Dort having in 1618 appointed a new translation of the Bible into Flemish, deputies were named for the work, which was not finished till the year 1637.

Danish Bible. The first Danish Bible was published by Peter Palladius, Olaus Chrysofom, John Synnigius, and John Maccabeus, in 1550, in which they followed Luther's first German version. There are two other versions, the one by John Paul Refenius bishop of Zealand, in 1605; the other, being the New Testament only, by John Michel, in 1524.

Swedish Bible. In 1534 Olaus and Laurence published a Swedish Bible from the German version of Martin Luther. It was revised in 1617, by order of king Gustavus Adolphus, and was afterwards almost universally received.

Bohemian, Polish, Russian or Muscovite, and Slavonian Bibles. The Bohemians have a Bible translated by eight of their doctors, whom they had sent to the schools of Wirtemberg and Basil, on purpose to study the original languages. It was printed in Moravia in the year 1539. The first Polish version of the Bible, it is said, was that composed by Hadewich wife of Jagellon, duke of Lithuania, who embraced Christianity in the year 1390. In 1599, there was a Polish translation

of the Bible published at Cracow, which was the work of several divines of that nation, and in which James Wieck, a Jesuit, had a principal share. The Protestants, in 1596, published a Polish Bible from Luther's German version, and dedicated it to Uladiflaus IV. king of Poland. The Russians or Muscovites published the Bible in their language in 1581. It was translated from the Greek by St Cyril, the apostle of the Slavonians; but this old version being too obscure, Ernest Gliik, who had been carried prisoner to Moscow after the taking of Narva, undertook a new translation of the Bible in the Slavonian; who dying in 1705, the Czar Peter appointed some particular divines to finish the translation: but whether it was ever printed, we cannot say.

English-Saxon, and modern English BIBLES. If we inquire into the versions of the Bible of our own country, we shall find that Adelm bishop of Sherburn, who lived in 709, made an English-Saxon version of the Psalms; and that Eadfrid, or Ecbert, bishop of Lindisferne, who lived about the year 730, translated several of the books of Scripture into the same language. It is said likewise, that venerable Bede, who died in 785, translated the whole Bible into Saxon. But Cuthbert, Bede's disciple, in the enumeration of his master's works, speaks only of his translation of the Gospel; and says nothing of the rest of the Bible. Some pretend, that king Alfred, who lived in 890, translated a great part of the Scriptures. We find an old version in the Anglo-Saxon of several books of the Bible, made by Elfric abbot of Malmesbury: it was published at Oxford, in 1699. There is an old Anglo-Saxon version of the four Gospels, published by Matthew Parker, archbishop of Canterbury, in 1571, the author whereof is unknown. Dr Mill observes, that this version was made from a Latin copy of the old Vulgate.

As to the English versions of the Bible, the most ancient is that of John de Trevisa, a secular priest, who translated the Old and New Testament into English, at the request of Thomas lord Berkley: he lived in the reign of Richard II. and finished his translation in the year 1357. The second author, who undertook this work, was the famous Wickliff, who lived in the reigns of Edward III. and Richard II. The manuscript of his version is in several libraries in England. In the year 1534, an English version of the Bible, done partly by William Tindal, and partly by Miles Coverdale, was brought into England from Antwerp. The bishops found great fault with this translation; upon which a motion was made in convocation for an English translation of the Bible to be set up in all churches. This motion, though opposed by bishop Gardiner and his party, succeeded at last. The king gave orders for setting about it with all possible haste, and within three years the impression of it was finished. Cromwell procured a general warrant from the king, allowing all his subjects to read it; for which Cranmer wrote his thanks to Cromwell, "rejoicing to see the work of reformation now risen in England, since the word of God did now shine over it all without a cloud." Cromwell likewise gave out injunctions, requiring the clergy to set up Bibles in all their churches, and to encourage the people to read them. In 1542, an act passed for restraining the use of the Bible. The preamble sets forth, that "many seditious and ignorant people had abused the liberty granted them for reading the Bible; and

that great diversity of opinions, animosities, tumults, and schisms had been occasioned by perverting the sense of the Scripture. To retrieve the mischiefs arising from hence, it is enacted, that a certain form of orthodox doctrine be set forth, as a standard of belief; and that Tindal's *false translation* of the Old and New Testament be suppressed, and forbidden to be read in any of the king's dominions." In the reign of Edward VI. Fuller mentions another translation of the Bible, printed in two editions; the first in 1549, the other in 1551, but neither of them divided into verses.

In the reign of queen Elizabeth came out the bishops Bible, so called, because several of that order were concerned in that version. The work was divided into several parcels, and assigned to men of learning and character. Most of the divisions are marked with great initial letters, signifying either the name or the titles of the persons employed. Archbishop Parker had the principal direction of this affair; he revised the performance, and perhaps put the finishing hand to it. He likewise employed several critics in the Hebrew and Greek languages, to review the old translation, and compare it with the original.

The last English Bible is that called *King James's Bible*, which proceeded from the Hampton-court conference in 1603, where many exceptions being made to the bishops Bible, king James gave orders for a new one, not, as the preface expresses it, for a translation altogether new, nor yet to make of a bad one a good one, but to make a good one better; or of many good ones, one best. Fifty-four learned persons were appointed for this office by the king, as appears by his letter to the archbishop, dated in 1604, which being three years before the translation was entered upon, it is probable seven of them were either dead, or had declined the task, since Fuller's list of the translators makes but 47, who, being ranged under six divisions, entered on their province in 1607. It was published in 1610, with a dedication to king James, and a learned preface, and is commonly called *king James's Bible*. After this all other versions dropped, and fell into disuse, except the Epistles and Gospels in the Common-prayer book, which were still continued, according to the bishops translation, till the alteration of the Liturgy in 1661, and the Psalms and hymns, which are to this day continued as in the old version.

The judicious Selden, in his *Table Talk*, speaking of the Bible, says, "The English translation of the Bible is the best translation in the world, and renders the sense of the original best, taking in for the English translation the bishop's Bible, as well as king James's. The translators in king James's time took an excellent way. That part of the Bible was given to him who was most excellent in such a tongue, (as the Apocalypse to Andrew Downs), and then they met together, and one read the translation, the rest holding in their hands some Bible either of the learned tongues, or French, Spanish, Italian, &c. If they found any fault, they spoke; if not, he read on."

King James's Bible is that now read by authority in all the churches in England.

Irish-BIBLE. Towards the middle of the 16th century, Bedell, bishop of Kilmore, set on foot a translation of the Old Testament into the Irish language; the New Testament and the Liturgy having been before

fore translated into that language. The bishop appointed one King to execute this work, who, not understanding the oriental languages, was obliged to translate it from the English. This work was received by Bedell, who, after having compared the Irish translation with the English, compared the latter with the Hebrew, the LXX. and the Italian version of Diodati. When this work was finished, the bishop would have been himself at the charge of the impression, but his design was stopped upon advice given to the lord-lieutenant and the archbishop of Canterbury, that it would prove a shameful thing for a nation to publish a Bible translated by such a despicable hand as King. However, the manuscript was not lost, for it went to press in the year 1685.

Some years ago, Dr Kennicott made a proposal for procuring a more correct copy of the Hebrew bible, by collecting and comparing together all the ancient manuscripts of it to be found in the British dominions. This was eagerly embraced by the learned, not only in Britain, but throughout all Christendom; and persons of the most eminent stations encouraged the work by liberal subscriptions. The work was begun in 1760, and in 1776 one volume was published in folio. To this work is prefixed such a list of subscribers as, we believe, never appeared in favour of any literary performance whatever. In this list are included no fewer than seven crowned heads, besides princes, cardinals, archbishops, bishops, universities, public libraries, and many of the most eminent literati in different parts of Europe. What is very extraordinary, Dr Kennicott's work seemed equally to draw the attention of Protestants and Papists, and was recommended and encouraged both by the church of Rome and of Geneva. The labour attending it must appear astonishing, when we consider that the Doctor collected, from all parts of the world, almost 700 MSS. and that these were compared together, and with the common Hebrew bible, not only word by word, but letter by letter. Certainly no undertaking ever deserved greater praise, nor promised to be of more important utility. In particular, the numerous various readings which he hath supplied cannot fail to demonstrate the expediency of a new translation of the Old Testament, or at least of an amendment of the present translation, at the same time that they will furnish the proper means of accomplishing it.

BIBLIANDER (Theodore), professor of divinity at Zurich in the 16th century. As he understood the Oriental languages, he set about a new edition of the Koran, the text of which he corrected, by collating the Arabic and Latin copies. To this edition he subjoined the life of Mahomet and his successors; and prefixed an apology by way of preface, which has been loudly exclaimed against.

BIBLIOTHECA, in its original and proper sense, denotes a library, or place for depositing books.

BIBLIOTHECA, in matters of literature, denotes a treatise giving an account of all the writers on a certain subject: thus, we have bibliothecas of theology, law, philosophy, &c.

There are likewise universal bibliothecas, which treat indifferently of all kinds of books; also select bibliothecas, which give account of none but authors of reputation.

Many of the bibliothecas agree, in most respects,

with what are otherwise called memoirs or journals of literature, except that these last are confined to new books; but there are other bibliothecas, that differ in nothing from catalogues of the writers on certain subjects.

BIBLISTS, in the Roman-catholic call those Christians who make scripture the sole rule of faith; in which sense, all Protestants either are, or ought to be, biblists.

BIBLUS, *Bibula*, in botany, an aquatic plant in Egypt, called also *papyrus*; of the skin whereof the ancient Egyptians made their paper. See Papyrus.

BIBRACTE, (anc. geog.), a citadel of the Ædui, according to Strabo; but Cæsar describes it as a town well fortified, very large and populous, and of the greatest authority among that nation. Now *Beurest*, or *Bevray*; a desolate place four miles to the north-west of Autun.

BIBROCI, (anc. geog.), an ancient people of Britain, now the *Hundred of Bray* in Berks.

BICANER, a city of Aha, on the river Ganges, belonging to the great Mogul. E. Long. 87. 20. N. Lat. 28. 40.

BICE, or *Biste*, among painters, a blue colour prepared from the lapis armenus *.

Bice bears the best body of all bright blues used in common work, as house-painting, &c. but it is the palest in colour. It works indifferently well, but inclines a little to sandy, and therefore requires good grinding. Next to ultramarine, which is too dear to be used in common work, it lies best near the eye of all other blues.

BICEPS, the name of several muscles: as the biceps humeri, or cubiti; biceps tibie; &c. †.

BICESTER, a straggling town of Oxfordshire in England, seated on the road between Oxford and Buckingham.

BICHET, a quantity or measure of corn, which differs according to the places where it is used. The bichet is not a wooden measure, as the minot at Paris, or the bushel at London; but is compounded of several certain measures. It is used in many parts of France, &c.

BICLINIUM, in Roman antiquity, a chamber with two beds in it; or when two beds only were round a table.

BICORNES, an order of plants in the *Systema methodi naturalis* of Linnæus, so termed from the antlers having in appearance two horns. See BOTANY.

BIDACHE, a town of Lower Navarre in France, seated on the river Bidoufe. W. Long. 10. 0. N. Lat. 41. 31.

BIDAL, or *Bidale*, in our ancient customs, denotes the invitation of friends to drink ale at some poor man's house, who, in consideration hereof, expects some contribution for his relief. This custom still obtains in the west of England, and is mentioned in some of our ancient statutes.

BIDDLE (John), one of the most eminent English writers among the Socinians, was born at Wotton-under-Edge in Gloucestershire, and educated in the free school of that place. Being a hopeful youth,

he was taken notice of; particularly by lord George Berkeley, who allowed him an exhibition of ten pounds a-year. This caused him vigorously to apply himself to his studies; and he was, while at school, author of a translation of Virgil's *Bucolics*, and

Biblus
Biddle.

* See *Armenius lapis*.

† See *Anatomy*, Table of the Muscles.

Biſſile
Bidding.

and of the two firſt ſatires of Juvenal. He continued at ſchool till he was 13 years of age. However, having manifeſted in that early period a ſingular piety and contempt of ſecular affairs, he was ſent to the univerſity of Oxford, and entered a ſtudent in Magdalen hall. In 1641, the magiſtrates of Glouceſter choſe him maſter of the free ſchool of that city; and he was much eſteemed: but falling into ſome opinions concerning the Trinity, different from thoſe commonly received, and expreſſing his thoughts with too much freedom, he ſuffered various perſecutions and imprifonments in the time of the commonwealth. During one of theſe confinements, which laſted for ſeveral years, being reduced to great indigence, he was employed by Roger Daniel of London to correct the impreſſion of the Greek Septuagint Bible, which that printer was about to publiſh with great accuracy. In 1651, the parliament publiſhed a general act of oblivion, which reſtored him to his full liberty. He was afterwards imprifoned on account of his tenets; and at laſt the proteſtor baniſhed him for life to St Mary's ſcalle in the iſle of Scilly, and ſent him thither in October 1655. Soon after, he was allowed 100 crowns a-year for ſubſiſtence. In 1658, he was ſet at full liberty. After the reſtoration of king Charles II. he was fined in 100 l. and each of his hearers in 20 l. to lie in priſon till paid; which being put in execution, the want of the freſh air and exerciſe made him contract a diſeaſe, of which he died on 22^d of September 1662, in the 47th year of his age. His life was publiſhed in Latin, in 1682, by Mr Farrington of the Inner Temple, who repreſents him as poſſeſſed of extraordinary piety, charity, and humility: he would not diſcourſe of thoſe points in which he differed from others, with thoſe that did not appear religious according to their knowledge; and was a ſtrict obſerver himſelf, and a ſevere exactor in others, of reverence in ſpeaking of God and Chriſt. He had ſo happy a memory, that he retained word for word the whole New Teſtament, not only in Engliſh, but in Greek, as far as the fourth chapter of the Revelations of St John.

BIDDIFORD, a town of Devonſhire, ſeated on the river Torridge, over which there is a fine ſtone-bridge with 24 arches. It is a large and populous place, and carries on a conſiderable trade. W. Long. 4. 10. N. Lat. 51. 10.

BIDDING, or **OFFERING**, denotes the raiſing the price of a thing at a ſale or auction *. The French call this *encherir*. It answers to what the Romans called *licitari*: they uſed to bid by holding up the hand or finger.

BIDDING is alſo uſed for proclaiming or notifying. In which ſenſe we meet with *bidding of the banns*, the ſame with what is otherwiſe called *aſking* *.

BIDDING-PRAYER. It was one part of the office of the deacons in the primitive Chriſtian church, to be a ſort of monitors and directors of the people in the exerciſe of their public devotions in the church. To which end they made uſe of certain known forms of words, to give notice when each part of the ſervice began. This was called by the Greeks *ἀναγνισκῆς*, and by the Latins *prædicare*: which therefore do not ordinarily ſignify to preach, as ſome miſtake it; but to perform the office of a crier (*ἀναγνῆς*, or *præco*) in the aſſembly: whence Synefius and others call the deacons *ἀναγνῆς*, the

holy criers of the church, appointed to bid or exhort the congregation to pray and join in the ſeveral parts of the ſervice of the church. Agreeable to this ancient practice is the form *Let us pray*, repeated before ſeveral of the prayers in the Engliſh liturgy.

BIDDING of the Beads, a charge or warning which the pariſh-prieſt gave to his pariſhioners at certain ſpecial times, to ſay ſo many pater-noſters, &c. on their beads.

BIDENS, **WATER-HEMP** **AGRIMONY**, a genus of the polygamia æqualis order, belonging to the ſynge-neſia claſs of plants. Of this genus Linnaeus enumerates 13 ſpecies; but none of them appear to merit notice except the tripartita, frequently found by the ſides of rivulets, ditches, and lakes, both in Scotland and England. This grows to the height of two feet; and hath its leaves divided into three, or often five, lanceolate ſerrated lobes, with yellow flowers, which are ſucceeded by flatliſh angular ſeeds, having two beards ariſing from the angles, which are hooked or barbed downwards; and generally they have another ſhorter beard ariſing from the middle of the back of the ſeed.

“As this plant (ſays Mr Lightfoot †) is found by the chemical analysis to poſſeſs much the ſame qualities as the celebrated verbeſina acmela, a plant belonging to a genus very nearly related to this, it is probable it would have the ſame good effects in expelling the ſtone and gravel. A decoction of this plant with alum dyes yarn of a yellow colour. The yarn muſt be firſt ſteeped in alum water, then dried and ſteeped in a decoction of the plant, and afterwards boiled in the decoction. The ſeeds have been known ſometimes to deſtroy the *cyprius auratus*, or gold fiſh, by adhering to their gills and jaws.”

BIDENTAL, in Roman antiquity, a place blaſted with lightning; which was immediately conſecrated by an haruſpex, with the ſacrifice of a bidens. This place was afterwards accounted ſacred, and it was unlawful to enter it or to tread upon it; for which reaſon it was commonly ſurrounded with a ditch, wall, hedge, ropes, &c. See next article.

BIDENTALES, in Roman antiquity, prieſts inſtituted to perform certain ceremonies and expiations when thunder fell on any place. Their principal office was the ſacrificing a ſheep of two years old, which in Latin is called *biden*; from whence the place ſtruck with thunder got the name of *bidental*.

BIDIS, (anc. geog.), a ſmall city of Sicily not far from Syracuſe, whole ruins are ſtill to be ſeen in the territory of Syracuſe, about fifteen miles to the ſouth-weſt, with a church called *S. Giovanni di Bidini*.

BIDLOO (Godfrey), author of ſeveral treatiſes in anatomy, was born at Amſterdam, March 12th, 1649. In 1688, he was profeſſor of anatomy at the Hague; and, in 1694, at Leyden; when king William III. of England appointed him his phyſician; which he would not accept but on condition of holding his profeſſorſhip, which was readily granted him. He publiſhed, in Latin, 1. The Anatomy of the human Body, demonſtrated in 105 cuts, explained by the diſcoveries of the ancient and modern writers. 2. An Oration upon the Antiquity of Anatomy. 3. A Letter to Anthony Leewenhoek on the animals ſometimes found in the liver of ſheep and other animals. 4. Two Decades of Diſſertations in Anatomy and Chirurgery; and other

* See Auction.

* See Banns.

other pieces. He died at Leyden, in April, 1713.

BIDON, a liquid measure, containing about five pints of Paris, that is, about five quarts English wine-measure. It is seldom used but among ships crews.

BIEEZ, a town of Poland, in the palatinate of Cracovia, remarkable for its mines of vitriol. It is seated on the river Wefeloke, in E. Long. 2. 21. N. Lat. 49. 50.

BIEL. See **BIENNA**.

BIELA, a town of Russia, and capital of a province of the same name, seated on the river Opschaw, in E. Long. 34. 55. N. Lat. 55. 0.

BIELA OSERO, or **BELOZERO**, a town of the Russian empire, capital of a duchy, and situated on a lake of the same name, at the mouth of the river Consa, in E. Long. 39. 10. N. Lat. 58. 55.

BIELA, a town of Piedmont in Italy, and capital of the Bellefe near the river Cerva, in E. Long. 8. 3. N. Lat. 45. 22.

BIELSKI, a town of Poland, in the palatinate of Polachia, near one of the sources of the river Narew. E. Long. 22. 55. N. Lat. 53. 50.

BIELSKOI, a town of Russia, in the province of Smolensko. E. Long. 35. 5. N. Lat. 56. 40.

BIENNA, a town of Switzerland, seated on a lake of the same name. The inhabitants are Protestants, and in alliance with those of Bern, Soleure, and Friburg. E. Long. 7. 14. N. Lat. 47. 11.

BIENNIAL PLANTS; plants, as the title *biennial* imports, that are only of two years duration. Numerous plants are of this tribe, which being raised one year from seed, generally attain perfection either the same, or in about the period of a twelvemonth, or a little less or more, and the following spring or summer shoot up stalks, flower, and perfect seeds; soon after which they commonly perish; or if any particular sort survive another year, they assume a dwindling and straggling growth, and gradually die off; so that biennials are always in their prime the first or second summer. Biennials consist both of esculents and flower-plants. Of the esculent kinds, the cabbage, favy, carrot, parsnep, beet, onion, leek, &c. are biennials. Of the flowery tribe, the Canterbury-bell, French honeysuckle, wall-flower, stock-july-flower, sweet-William, China-pink, common-pink, matted-pink, carnation, scabious, holly-hock, tree-mallow, vervain-mallow, tree-primrose, honesty, or moonwort, &c. are all of the biennial tribe; all of which being sown in March, April, or May, rise the same year, and in spring following shoot up into stalks, flower, and perfect seeds in autumn; after which most of them dwindle: though sometimes the wall-flowers, hollyhocks, carnations, pinks, will survive and flower the following year; but the plants become straggling, the flowers small and badly coloured: it is therefore eligible to raise a supply annually from seed; although wall-flowers, carnations, and pinks, may be continued by slips and layers.

BIER, a wooden machine for carrying the bodies of the dead to be buried. The word comes from the French *biere*, which signifies the same. It is called in Latin *feretrum*, a *ferendo*. Among the Romans the common bier, whereon the poorer sort were carried, was called *sandapila*; that used for the richer sort, *lectica*, *lectica funebria*, sometimes *lectus*. The former was only a sort of wooden chest, *vilis arca*, which was

burnt with the body; the latter was enriched and gilded for pomp. It was carried bare, or uncovered, when the person died a natural and easy death; when he was much disfigured or distorted, it was veiled or covered over.

BIER is more particularly used for that whereon the bodies of saints are placed in the church to rest, and exposed to the veneration of the devout. This is also called, in middle-age writers, *lectus*, *feretrum*, *lectica*, and *loculus*; and was usually enriched with gold, silver, and precious stones, which was the cause that the bier of St Benedict was pillaged, and all its ornaments carried off.

BIEROLIET, a town of the Netherlands in Dutch Flanders, where William Bruckfield, or *Beukelings*, who invented the method of pickling herrings, died in 1397. E. Long. 3. 42. N. Lat. 51. 25.

BIFERÆ, plants that flower twice a-year, in spring, and autumn, as is common between the tropics.

BIGA, in antiquity, a chariot drawn by two horses abreast. Chariot-races, with two horses, were introduced into the Olympic games in the 93^d Olympiad; but the invention was much more ancient, as we find that the heroes in the Iliad fight from chariots of that kind. The moon, night, and the morning, are by mythologists supposed to be carried in *bige*, the sun in *quadrigæ*. Statues in *bige* were at first only allowed to the gods, then to conquerors in the Grecian games; under the Roman emperors, the like statues, with *bige*, were decreed and granted to great and well-deserving men, as a kind of half triumph, being erected in most public places of the city. Figures of *bige* were also struck on their coins. The drivers of *bige* were called *bigarii*; a marble bust of one Florus a *bigarius* is still seen at Rome.

BIGAMY, properly signifies being *twice married*; but with us is used as synonymous to polygamy, or having a plurality of wives at once. Such second marriage, living the former husband or wife, is simply void, and a mere nullity, by the ecclesiastical law of England; and yet the legislature has thought it just to make it felony, by reason of its being so great a violation of the public œconomy and decency of a well ordered state. For polygamy can never be endured under any rational civil establishment, whatever specious reasons may be urged for it by the eastern nations, the fallaciousness of which has been fully proved by many sensible writers: but in northern countries the very nature of the climate seems to reclaim against it; it never having obtained in this part of the world, even from the time of our German ancestors, who, as Tacitus informs us, "*prope soli barbarorum singulis uxoribus contenti sunt.*" It is therefore punished by the laws both of ancient and modern Sweden with death. And in Britain it is enacted by statute 1 Jac. I. c. 11. that if any person, being married, do afterwards marry again, the former husband or wife being alive, it is felony; but within the benefit of clergy. The first wife in this case shall not be admitted as an evidence against her husband, because she is the true wife; but the second may, for she is indeed no wife at all: and so, *vice versa*, of a second husband. This act makes an exception to five cases, in which such second marriage, though in the three first it is void, is yet not felony. 1. Where either party hath been continually

Bier
Bigamy.

Bigati
||
Bignon.

tinually abroad for seven years, whether the party in England hath notice of the other's being alive or no.

2. Where either of the parties hath been absent from the other seven years within this kingdom, and the remaining party hath had no knowledge of the other's being alive within that time. 3. Where there is a divorce (or separation *a mensa et thoro*) by sentence in the ecclesiastical court. 4. Where the first marriage is declared absolutely void by any such sentence, and the parties loosed *a vinculo*. Or, 5. Where either of the parties was under the age of consent at the time of the first marriage; for in such case the first marriage was voidable by the disagreement of either party, which the second marriage very clearly amounts to. But, if at the age of consent the parties had agreed to the marriage, which completes the contract, and is indeed the real marriage; and afterwards one of them should marry again; Judge Blackstone apprehends that such second marriage would be within the reason and penalties of the act.

BIGATI, in antiquity, a kind of ancient Roman silver coins, on one side whereof was represented a *biga*, or chariot drawn by two horses. The *bigatus* was properly the Roman denarius, whose impression, during the times of the commonwealth, was a chariot driven by victory, and drawn either by two horses or four, according to which it was either denominated *bigatus* or *quadrigatus*.

BIGGESWADE, a town of Bedfordshire in England, seated on the river Ivel, over which there is a handsome bridge. The town is much more considerable now than formerly, on account of its commodious inns for passengers, it lying on the principal road from London to York. W. Long. o. 15. N. Lat. 52. 5.

BIGHT, among seamen, denotes one roll, or round, of a cable or rope, when coiled up.

BIGNON (Jerome), a French writer, was born at Paris in 1590. He gained an uncommon knowledge, under the care of his father, in philosophy, mathematics, history, civil law, and divinity, in a very short time; and was almost at the end of his studies at an age when it is usual to send children to school. At ten years of age he gave the public a specimen of his learning, in a Description of the Holy Land; and two years after, he published a Discourse concerning the principal antiquities and curiosities of Rome; and A summary treatise concerning the election of Popes. Henry IV. desired to see him, and appointed him page to the dauphin, who was afterwards Louis XIII. He appeared at court with all the politeness of manners imaginable. He wrote at that time a Treatise of the precedence of the kings of France, which he dedicated to Henry IV. who gave him an express order to continue his researches on that subject: but the death of that prince interrupted his design. He published, in 1613, the *Formule* of Marculphus. He was in 1620 made advocate-general in the grand council; and discharged that post with such reputation, that the king nominated him some time after counsellor of state, and at last advocate-general in the parliament. He resigned his offices in 1641; and the year following was appointed chief library-keeper of the king's library. He was obliged to resume his office of advocate-general, and held it till his death. He was employed in the most important affairs of state. At last this great man, who

had always made religion the basis of his other virtues, died with the most exemplary devotion in 1656.

BIGNONIA, TRUMPET-FLOWER, or SCARLET JASMINE, a genus of the angiospermia order, belonging to the didynamia class of plants.

Species. Of this genus Linnæus enumerates 17 species; of which the following are the most remarkable.

1. The radicans, or climbing ash-leaved bignonia, is a native of Virginia and Canada. It rises 30 or 40 feet high, having pinnated opposite leaves of four pair of serrated lobes, and an odd one: all the shoots and branches being terminated by beautiful clusters of large trumpet-shaped scarlet flowers. The humming birds delight to feed on these flowers, and by thrusting themselves too far into them are sometimes caught. Of this species there is a variety with smaller flowers. 2. The sempervirens, or evergreen climbing Virginia bignonia, is a native of Virginia, Carolina, and the Bahama islands. The stalks are more slender than those of the former species; yet they rise, upon proper supports, to the height of 20 or 30 feet; the flowers are trumpet-shaped, erect, and of a yellow colour, proceeding from the sides and ends of the stalks and branches. 3. The catalpa, is a native of the same countries. It hath a strong woody stem and branches, rising 20 feet high, ornamented with large heart-shaped leaves, five or six inches long, and almost as broad, placed by threes, with whitish yellow-striped flowers coming out in panicles towards the ends of the branches. This deserves a place in all curious shrubberies, as during the summer season no tree makes a more beautiful appearance; for which reason it should be placed conspicuously; or some might be planted singly upon spacious lawns, or other large opens of grass ground, and permitted to take their natural growth.

Culture. The two first species may be propagated by layers; every shoot laid down will readily grow, and will flower in two or three years. Cuttings of the strong shoots will also put out roots freely. They may be also propagated by seeds procured from America. These should be sown in the spring, in pots placed in a moderate hot-bed, from which the plants must be inured to the open air in summer; they are to be sheltered from the frost in winter, and next spring may be planted in the ground where they are to remain: but plants thus raised seldom flower in less than six or seven years. The catalpa may be propagated from the cuttings of its young shoots planted in the spring in pots plunged into a hot-bed. They will take root in a month or six weeks, when they must be hardened to the open air, in which they may stand till the month of October, and then be moved to a place of occasional shelter from frost, and in the following spring planted out in the nursery. They may be raised from seeds planted either in a warm border, or in pots plunged in a moderate hot-bed, which will facilitate the germination of the seed that is otherwise apt to remain a year in the ground before it begins to grow.

BIGORRE, a territory or county of France, in the province of Gascony. It is bounded on the east by the valley of Aure, the viscounty of Nebouffia, Riviere Verdun, and Pardiac; by Bearn on the west; on the south, by the valleys of Broton and Penticoese in Arragon; and on the north, by the county of Riviere-Bas incorporated with Armagnac. It is 40 miles long from

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from north to south, and 30 in breadth from east to west. It is divided into three parts, the mountains, the plains, and the rufan. The mountains are inclosed between those of the valley of Aurc on the east, thofe of Arragou on the fouth, and of Bearn on the weft. This part contains two principal valleys, Lavedan and Barege. The valley of Bigorre is of an oval form, and has the hills of Ruffan on the eaft. The remarkable towns are Tarbes the capital, Bagneres, Lour, &c. The mountains are a barrier between France and Spain, and there are four different paffages which the inhabitants are obliged to guard. Bigorre yields marble, jafper, ftone, and flate: there are alfo mines of feveral forts, but they are not worked. The rivers are the Adour, the Elches, the Arroget, and the Gave de Lavedan; there are alfo three lakes.

BIGOT, a perfon obftinately and perversely wedded to fome opinion or practice, particularly of a religious nature. Camden, perhaps, has hit upon the true original of the word. He relates, that when Rollo, duke of Normandy, received Gilla, the daughter of Charles the foolifh, in marriage, together with the inveftiture of that dukedom, he would not fubmit to kifs Charles's foot: and when his friends urged him by all means to comply with that ceremony, he made answer in the Englifh tongue, *NE SE BY GOD, I. e. Not fo by God.* Upon which, the king and his courtiers deriding him, and corruptly repeating his answer, called him *bigot*; from whence the Normans were called *bigods*, or *bigots*.

BIHAEZ, a ftrong town of Croatia in Hungary, feated in an ifle formed by the river Anna, in E. Long. 16. 2. N. Lat. 44. 35.

BILBILIS, (anc. geog.), a town of Hifpania Citerior, the birth-place of Martial; now fuppofed to be Calatajud in Arragon on the Xalon. See CALATAJUD.

BILBOA, a large, handfome, and rich town of Spain, capital of Bifcay, with a well frequented harbour. It is remarkable for the wholefomenefs of its air and the fertility of the foil about it. The inhabitants have always preferred themfelves from a mixture with the Jews and Moors; and therefore will admit no family to settle among them but who can prove themfelves to be of Chriftian extraction, nor will they admit any flaves among them as in the other parts of Spain. The exports are wool, and fword-blades, with fome other manufactures of iron and fteel. The town is feated at the mouth of the river Ibaicabal, in W. Long. 4. 20. N. Lat. 43. 23.

BILBOWS, a punifhment at fea, answering to the flocks at land. The offender is laid in irons, or ftocks, which are more or lefs ponderous according to the quality of the offence of which he is guilty.

BILDESTON, a town of Suffolk in England, feated on a creek on the river Breton. The principal manufacture is in woollen goods, efpecially blankets. E. Long. 0. 45. N. Lat. 52. 20.

BILDGE of a fhip, the bottom of her floor, or the breadth of the place the fhip refts on when fhe is a-ground. Therefore, *bildge-water* is that which lies on her floor, and cannot go to the well of the pump: And *bildge-pumps*, or burr-pumps, are thofe that carry off the bildge-water. They likewife fay the fhip is *bildged*, when fhe has fome of her timber ftuck off on a rock or anchor, and fprings a leak.

BILE, a yellow, bitter juice, feparated from the

blood in the liver, collected in the porus bilarius and gall-bladder, and thence difcharged by the common duft into the duodenum *.

* See *Anatomy*, n^o. 358, 359.

BILEDULGERID, or BELAD AL JERID, the *Country of dates*, a kingdom of Africa. It is almoft of a fquare form, extending itfelf more than 80 leagues every way, from 28. 30. to 32. 50. north latitude, and from 6 to 12 degrees of weft longitude. It is bounded on the north by the kingdom of Tunis, on the eaft by a ridge of lofty mountains which divide it from Tripoli and part of Gadamis, on the weft by the countries of Zeb and Mezeb, and on the fouth by the province of Verghela. The whole country is barren, fanddy, and mountainous, producing little or nothing befides dates, which grow here in fuch profufion, that the face of half the kingdom is covered over with date-trees, and from hence the whole country takes its name. The climate is hot and unhealthy: the people lean, fwarthy, and shrivelled in their complexions; with their eyes inflamed, owing to the reflection of the fun-beams from the white hard foil; and the showers of duft and fand driven by the high winds that blow here at certain feafons are frequently fo violent as to bury men and cattle under them. Another inconvenience with which the inhabitants are afflicted, for which no other reafon is given befides their conftant living on dates, is, an inveterate fcurvey in their gums, whence all their teeth drop out; though it frequently fpreads over their whole bodies, and then they become the moft unhappy and loathfome objects. They are almoft entirely free from other difeafes; fo that when not afflicted with this, they live to a good old age; though it is observable that they difcover a furrowed countenance, shrivelled fkin, hoary locks, and other fymptoms of old age, very early in life, and before decrepitude, infirmity, or any decay of their faculties, appear. The plague is not known in Biledulgerid, though fo frequent in Barbary, and though a conftant intercourfe is kept up between the two countries; whence it would feem, that in certain cafes this terrible diftemper is not fo infectious as it is ufually thought to be. The fame may be faid of the fmall-pox, a difeafe little lefs contagious and fatal in hot countries than the plague itfelf. The natives are reprefented as a lewd, treacherous, thievifh, and favage people, who delight in murder and robbery. They are moftly a mixture of Africans and wild Arabs who mingled themfelves with them. The former live with fome regularity and civil order in a kind of villages compofed of a number of little huts; the latter in tents, ranging from place to place in queft of food and plunder. The Arabs, who pride themfelves in their fuperiority of birth and talents above the primitive inhabitants, are wholly independent and free, frequently hiring themfelves in the fervice of the neighbouring princes at war; from which policy arife the moft valuable branches of their public revenue, if any thing can be called common or public in a nation of lawlefs robbers. The reft purfue no other occupation befides hunting and plundering; the firft of which is their common employment, efpecially hunting of oltriches, which are faid to be of a prodigious ftature in this country, and as high as a man mounted on a tall horfe. The inhabitants eat the flefh of thefe animals; barter their feathers for corn, pulfe, and other things they want; ufe their hearts in their necromancy

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tic and religious rites, their fat as a medicine of sovereign virtue, their talons for ear-pendants and other ornaments, and their skins they convert into pouches and knapsacks, so that not a part of the animal but is employed in some useful purpose. Besides dates and ostriches, the Arabs live likewise on the flesh of goats and camels; drinking either the liquor or broth in which that flesh is boiled, or the milk of their camels; for they seldom taste water, that element being more scarce in this country than milk itself. In the whole country there is scarce a town of any note, or even a stream of water that deserves notice, or that is not dried up half the year.

BILEVELT, a town of Germany, in the circle of Westphalia and county of Ravensburg, subject to the king of Prussia, in E. Long. 8. 20. N. Lat. 52. 0.

BILINGUIS, in a general sense, signifies one that speaks two languages; but in law, is used for a jury that passes in any case between an Englishman and a foreigner, whereof part ought to be English, and part strangers.

BILIOUS, in general, denotes something belonging to, or partaking of, the nature of bile. Hence,

BILIOUS *Fevers* are those occasioned by the over-copiousness or bad qualities of the bile *.

BILL, in mechanics, an instrument made of iron, edged in the form of a crescent, and adapted to a handle. It is used by plumbers, to perform several parts of their work; by basket-makers, to cut the largest pieces of chefnut-trees and other wood; and by gardeners, to prune trees. When short, it is called a *hand-bill*; and when long, a *hedge-bill*.

BILL, in law, a security for money under the hand, and sometimes the seal of the debtor. It is of two sorts, a single bill without or with a penalty; the latter is the same as a bond, except its being without a condition.

BILL also implies a declaration in writing, expressing either some wrong the complainant has suffered from the defendant, or a fault committed by the person complained of against some law or statute.—This bill is sometimes exhibited to justices at the general assizes, by way of indictment, or referred to others having jurisdiction; but is more generally addressed to the lord chancellor. It contains the fact complained of, the damage sustained, and a petition or process against the defendant for redress; and is used both in criminal and civil cases. In the former, the words *billa vera* are indorsed by the grand jury upon a presentment, implying that they find the same founded on probable evidence, and therefore worthy of further consideration.

In Scots law, every summary application in writing, by way of petition to the court of session, is called a *bill*.

Bill of Attainder. See *ATTAINDER*.

Bill of Appeal. See *APPEAL*.

BILL signifies also a paper, either written or printed, in very large characters, which is posted up in some open and public place, to give notice of the sale of any merchandize or ship, or of the sailing of any vessel into foreign parts.

BILL, in trade, both wholesale and retail, as also among workmen, signifies an account of merchandizes, or goods delivered to a person, or of work done for one.

Bank-Bill, a private instrument whereby private persons become intitled to a part in the bank-stock.

BILL of *Entry*, an account of the goods entered at the custom-house, both inwards and outwards. In this bill must be expressed, the merchant exporting or importing; the quantity of merchandize, and the divers species thereof; and whither transported, or from whence.

BILL of *Exchange*, is a security, originally invented among merchants in different countries, for the more easy remittance of money from the one to the other, which has since spread itself into almost all pecuniary transactions. It is an open letter of request from one man to another, desiring him to pay a sum named therein to a third person on his account; by which means a man at the most distant part of the world may have money remitted to him from any trading country. If A lives in Jamaica, and owes B who lives in England 1000l. now if C be going from England to Jamaica, he may pay B this 1000l. and take a bill of exchange drawn by B in England upon A in Jamaica, and receive it when he comes thither. Thus does B receive his debt, at any distance of place, by transferring it to C; who carries over his money in paper-credit, without danger of robbery or loss. This method is said to have been brought into general use by the Jews and Lombards, when banished for their usury and other vices; in order the more easily to draw their effects out of France and England, into those countries in which they had chosen to reside. But the invention of it was a little earlier; for the Jews were banished out of Guienne in 1287, and out of England in 1290, and in 1236 the use of paper-credit was introduced into the Mogul empire in China.—In common speech, such a bill is frequently called a *draught*; but a bill of exchange is the more legal as well as mercantile expression. The person, however, who writes this letter is called, in law, the *drawer*; and he to whom it is written, the *drawee*; and the third person or negotiator to whom it is payable (whether specially named, or the bearer generally) is called the *payee*.

These bills are either foreign, or inland; foreign, when drawn by a merchant residing abroad upon his correspondent in England, or *vice versa*; and inland, when both the drawer and the drawee reside within the kingdom. Formerly foreign bills of exchange were much more regarded in the eye of the law than inland ones, as being thought of more public concern in the advancement of trade and commerce. But now by two statutes, the one 9 & 10 W. III. c. 17. the other 3 and 4 Ann. c. 9. inland bills of exchange are put upon the same footing as foreign ones; what was the law and custom of merchants with regard to the one, and taken notice of merely as such, being by those statutes expressly enacted with regard to the other. So that there is now in law no manner of difference between them†.

BILL of *Lading*, an acknowledgment signed by the master of a ship, and given to a merchant, &c. containing an account of the goods which the master has received on board from that merchant, &c. with a promise to deliver them at an intended place for a certain salary. Each bill of lading must be treble, one for the merchant who loads the goods, another to be sent to the person to whom they are consigned, and the third to remain in the hands of the master of the ship. It

must

* See the Index sub-joined to *Medicine*.

must be observed, however, that a bill of lading is used only when the goods, sent on board a ship, are but part of the cargo: for when a merchant loads a whole vessel for his own personal account, the deed passed between him and the master of the ship is called *charter-party*. See *CHARTER-party*.

Bills of Mortality, are accounts of the numbers of births and burials within a certain district, every week, month, quarter, or year. In this sense we say *weekly bills*, *monthly bills*, *quarterly bills*, *yearly bills*. The London bills of mortality, which were the first, are composed by the company of parish-clerks, and express the number of christenings of each sex, and the number of deaths from each disease.

Bill of Parcels, an account given by the seller to the buyer, containing the particulars of all the sorts and prices of the goods bought.

Bill of Sale, is when a person wanting a sum of money, delivers goods as a security to the lender, to whom he gives this bill, empowering him to sell the goods, in case the sum borrowed is not repaid, with interest, at the appointed time.

Bill of Store, a licence granted at the custom-house to merchants, by which they have liberty to carry, custom-free, all such stores and provisions as they may have occasion for during their voyage.

Bill of Suffrance, a licence granted to a merchant, at the custom-house, suffering him to trade from one English port to another, without paying custom.

Lombard Bills, are instruments of an uncommon kind and figure, used in Italy and Flanders, and of late also in France; consisting of a piece of parchment, cut to an acute angle about an inch broad at top, and terminating in a point at bottom; chiefly given, where private persons are concerned in the fitting out a ship on any long voyage. The manner is thus: The party, who is desirous to be concerned in the cargo or venture, carries his money to the merchant, who fits out the ship, where it is entered down in a register: at the same time the merchant writes down on a piece of parchment, upwards of an inch broad, and seven or eight inches long, the name of the lender, and the sum lent; which being cut diagonal-wise, or from corner to corner, each party retains his half. On the return of the vessel, the lender brings his moiety to the merchant; which being compared with the other, he receives his dividend accordingly. Much the same is practised in Holland by those who lend money on pledges: the name of the borrower, and the sum, are written on a like slip of parchment, which is cut in two, and half given to the borrower, and the other half stitched to the pledge; that, upon comparing them together again, the borrower may receive his goods on paying the money stipulated.

Bill in Parliament, a paper containing propositions offered to the houses to be passed by them, and then presented to the king to pass into a law.

To bring a bill into the house, if the relief sought by it is of a private nature, it is first necessary to prefer a petition; which must be presented by a member, and usually sets forth the grievance desired to be remedied. This petition (when founded on facts that may be in their nature disputed) is referred to a committee of members, who examine the matter alleged, and accordingly report it to the house; and then (or, other-

wise, upon the mere petition) leave is given to bring in the bill. In public matters, the bill is brought in upon motion made to the house, without any petition at all. Formerly, all bills were drawn in the form of petitions, which were entered upon the parliament-rolls, with the king's answer thereunto subjoined; not in any settled form of words, but as the circumstances of the case required: and at the end of each parliament the judges drew them into the form of a statute, which was entered on the statute-rolls. In the reign of Henry V. to prevent mistakes and abuses, the statutes were drawn up by the judges before the end of the parliament; and, in the reign of Henry VI. bills in the form of acts, according to the modern custom, were first introduced.

The persons directed to bring in the bill, present it in a competent time to the house, drawn out on paper, with a multitude of blanks, or void spaces, where any thing occurs that is dubious, or necessary to be settled by the parliament itself; (such, especially, as the precise date of times, the nature and quantity of penalties, or of any sums of money to be raised) being indeed only the skeleton of the bill. In the house of lords, if the bill begins there, it is (when of a private nature) referred to two of the judges, who examine and report the state of the facts alleged, to see that all necessary parties consent, and to settle all points of technical propriety. This is read a first time, and at a convenient distance a second time; and after each reading the speaker opens to the house the substance of the bill, and puts the question, Whether it shall proceed any farther. The introduction of the bill may be originally opposed, as the bill itself may at either of the readings; and, if the opposition succeeds, the bill must be dropped for that session; as it must also, if opposed with success in any of the subsequent stages.

After the second reading, it is committed; that is, referred to a committee: which is either selected by the house in matters of small importance; or else, upon a bill of consequence, the house resolves itself into a committee of the whole house. A committee of the whole house is composed of every member; and, to form it, the speaker quits the chair, (another member being appointed chairman), and may sit and debate as a private member. In these committees the bill is debated clause by clause, amendments made, the blanks filled up, and sometimes the bill entirely new-modelled. After it has gone through the committee, the chairman reports it to the house with such amendments as the committee have made; and then the house reconsiders the whole bill again, and the question is repeatedly put upon every clause and amendment. When the house hath agreed or disagreed to the amendments of the committee, and sometimes added new amendments of its own, the bill is then ordered to be engrossed, or written in a strong gross hand, on one or more long rolls (or presses) of parchment sewed together. When this is finished, it is read a third time, and amendments are sometimes then made to it; and if a new clause be added, it is done by tacking a separate piece of parchment on the bill, which is called a *ryder*. The speaker then again opens the contents; and, holding it up in his hands, puts the question, Whether the bill shall pass. If this is agreed to, the title to it is then settled; which used to be a general one for all the acts passed in the session, till in the fifth year of Hen. VIII. distinct titles were

were introduced for each chapter. After this, one of the members is directed to carry it to the lords, and desire their concurrence; who, attended by several more, carries it to the bar of the house of peers, and there delivers it to their speaker, who comes down from his woolfack to receive it.

It there passes thro' the same forms as in the other house, (except engrossing, which is already done); and, if rejected, no more notice is taken, but it passes *sub silentio*, to prevent unbecoming altercations. But if it is agreed to, the lords send a message by two masters in chancery (or sometimes two of the judges) that they have agreed to the same: and the bill remains with the lords, if they have made no amendment to it. But if any amendments are made, such amendments are sent down with the bill to receive the concurrence of the commons. If the commons disagree to the amendments, a conference usually follows between members deputed from each house; who for the most part settle and adjust the difference: but, if both houses remain inflexible, the bill is dropped. If the commons agree to the amendments, the bill is sent back to the lords by one of the members, with a message to acquaint them therewith. The same forms are observed, *mutatis mutandis*, when the bill begins in the house of lords. But, when an act of grace or pardon is passed, it is first signed by his majesty, and then read once only in each of the houses, without any new engrossing or amendment. And when both houses have done with any bill, it always is deposited in the house of peers, to wait the royal assent; except in the case of a bill of supply, which after receiving the concurrence of the lords is sent back to the house of commons.

The royal assent may be given two ways: 1. In person; when the king comes to the house of peers, in his crown and royal robes, and sending for the commons to the bar, the titles of all the bills that have passed both houses are read; and the king's answer is declared by the clerk of the parliament in Norman-French: a badge, it must be owned, (now the only one remaining) of conquest; and which one could wish to see fall into total oblivion; unless it be reserved as a solemn memento to remind us that our liberties are mortal, having been once destroyed by a foreign force. If the king consents to a public bill, the clerk usually declares, *Le roy le veut*, "The king wills it to be;" if to a private bill, *Soit fait come il est desire*, "Be it as it is desired." If the king refuses his assent, it is in the gentle language of *Le roy s'avisera*, "The king will advise upon it." When a bill of supply is passed, it is carried up and presented to the king by the speaker of the house of commons; and the royal assent is thus expressed, *Le roy remercie ses loyal subjects, accepte leur benevolence, et aussi le veut*; "The king thanks his loyal subjects, accepts their benevolence, and wills it so to be." In case of an act of grace, which originally proceeds from the crown and has the royal assent in the first stage of it, the clerk of the parliament thus pronounces the gratitude of the subject: *Les prelatz, seigneurs, et commons, en ce present parliament assemblez, au nom de tous vous autres subjects, remercient tres humblement votre majeste, et prient a Dieu vous donner en sante bonne vie et longue*; "The prelates, lords, and commons, in this present parliament assembled, in the name of all your other subjects, most humbly thank your majesty,

and pray to God to grant you in health and wealth long to live." 2. By the statute 33 Hen. VIII. c. 21. the king may give his assent by letters patent under his great seal, signed with his hand, and notified in his absence to both houses assembled together in the high house. And, when the bill has received the royal assent in either of these ways, it is then, and not before, a statute or act of parliament.

This statute or act is placed among the records of the kingdom; there needing no formal promulgation to give it the force of a law, as was necessary by the civil law with regard to the emperor's edicts: because every man in Britain is, in judgment of law, party to the making of an edict of parliament, being present therat by his representatives. However, a copy thereof is usually printed at the king's press for the information of the whole land. And formerly, before the invention of printing, it was used to be published by the sheriff of every county; the king's writ being sent to him at the end of every session, together with a transcript of all the acts made at that session, commanding him, *ut statuta illa, et omnes articulos in eisdem contentos, in singulis locis ubi expedire viderit, publice proclamari, et firmiter teneri et observari faciat*. And the usage was to proclaim them at his county court, and there to keep them, that whoever would might read or take copies thereof; which custom continued till the reign of Henry VII.

An act of parliament, thus made, is the exercise of the highest authority that this kingdom acknowledges upon earth. It hath power to bind every subject in the land, and the dominions thereunto belonging; nay, even the king himself, if particularly named therein. And it cannot be altered, amended, dispensed with, suspended, or repealed, but in the same forms and by the same authority of parliament: for it is a maxim in law, that it requires the same strength to dissolve, as to create, an obligation. It is true, it was formerly held, that the king might in many cases dispense with penal statutes: but now by statute 1 W. and M. ft. 2. c. 2. it is declared, that the suspending or dispensing with laws by regal authority, without consent of parliament, is illegal.

BILL of Rights. See the article LIBERTY.

BILLERÍCAY, a town of Essex in England, seated on a hill, in E. Long. o. 25. N. Lat. 51. 35.

BILLET, in heraldry, a bearing in form of a long square. They are supposed to represent pieces of cloth of gold or silver; but Guillim thinks they represent a letter sealed up, and other authors take them for bricks. *Billeté* signifies that the escutcheon is all over-strewed with billets, the number not ascertained.

BILLET-WOOD, small wood for fuel, cut three feet and four inches long, and seven inches and a half in compass; the affize of which is to be inquired of by justices.

BILLETING, in military affairs, is the quartering of soldiers in the houses of a town or village.—And, among fox-hunters, it signifies the ordure and dung of a fox.

BILLIARDS, an ingenious kind of game, played on a rectangular table, covered with green cloth, and placed exactly level, with little ivory balls, which are driven by crooked sticks, made on purpose, into hazards or holes, on the edge and corners of the table, according to certain rules of the game.

BILLINGHAM, a town of Northumberland in England, seated in W. Long. 1. 35. N. Lat. 55. 20.
BILLON, in the history of coins, a composition of precious and base metals, where the latter predominate. Wherefore gold under twelve carats fine, is called billon of gold; and silver under six penny-weight, billon of silver. So little attention was paid formerly to the purity of gold and silver, that the term billon of gold was applied only to that which was under twenty-one carats, and billon of silver to that which was lower than ten penny-weight.

BILLOM, a town of Auvergne in France, situated in E. Long. 3. 30. N. Lat. 45. 36.

BILSDON, a small town of Leicestershire in England, situated in W. Long. 0. 15. N. Lat. 52. 40.

BILSEN, a town of Germany, in the circle of Westphalia and bishopric of Liege, seated on the river Demer, in E. Long. 5. 42. N. Lat. 50. 48.

BILSON (Thomas), bishop of Winchester, in which city he was born and educated. In 1565, he was admitted perpetual fellow of New college, and in 1570 completed his degrees in arts. He was made bachelor of divinity in 1579, and doctor the year following. His first preferment was that of master of Winchester school; he was next made prebendary, and afterwards warden, of Winchester college. In 1596 he was consecrated bishop of Worcester; and, about a year after, translated to the see of Winchester, and sworn of queen Elizabeth's privy council. He was one of the principal managers of the Hampton-court conference in 1604; and the English translation of the Bible in the reign of king James I. was finally corrected by this prelate, and Dr Miles Smith bishop of Gloucester. He died in the year 1616; and was buried in Westminster abbey, near the entrance of St Edmund's chapel, on the south side of the monument of king Richard II. The several authors who have mentioned bishop Bilson, agree in giving him the character of a learned divine, an able civilian, and an upright man. His style is, in general, much more easy and harmonious than that of cotemporary ecclesiastics. His works are, 1. *Several Latin poems and orations.* Manuscript, in Ant. Wood's library. 2. *The true difference between Christian subjection and unchristian rebellion.* Oxf. 1585, 4to. Lond. 1586, 8vo. 3. *The perpetual government of Christ's church.* Lond. 1593, 4to. Black Letter. 4. *The effect of certain sermons touching the full redemption of mankind by the death and blood of Christ, &c.* Lond. 1599, 4to. 5. *The survey of Christ's sufferings for man's redemption, and of his descent to Hades, or Hell.* Lond. 1604, fol. 6. *A sermon preached before king James I. and his queen at their coronation.* Lond. 1603, 8vo.

BIMEDIAL, in mathematics. If two medial lines, as AB and BC, commensurable only in power, containing a rational rectangle, are compounded, the whole line AC will be irrational, and is called a *first bimedral line*.

A ————— B ————— C

See Euclid. lib. X. prop. 38.

BIMINI, one of the Lucaya islands in North America, near the channel of Bahama. It is about eight miles in length, and as much in breadth, covered with trees, and inhabited by the native Americans. It is

very difficult of access on account of the shoals, but is a very pleasant place. W. Long. 79. 30. N. Lat. 25. 0.

Bimlipatan
Eng.

BIMLIPATAN, a sea-port town of Golconda in the East Indies, seated on the west side of the bay of Bengal. Here the Dutch have a very small factory, designed for buying up the cloth manufactured by the inhabitants. E. Long. 83. 5. N. Lat. 18. 0.

BINACLE, a wooden case or box, which contains the compasses, log-glasses, watch-glasses, and lights to shew the compass at night. As this is called *bittacle* in all the old sea-books, even by mariners, it appears evidently to be derived from the French term *habitable* (a small habitation), which is now used for the same purpose by the seamen of that nation.—The binacle (Plate LVII. fig. 4.) is furnished with three apartments, with sliding shutters: the two side ones, *a b*, have always a compass in each, *d*, to direct the ship's way; while the middle division, *c*, has a lamp or candle with a pane of glass on either side to throw a light upon the compass in the night, whereby the man who steers may observe it in the darkest weather, as it stands immediately before the helm on the quarter deck. There are always two binacles on the deck of a ship of war, one being designed for the man who steers, and the other for the person who superintends the steering, whose office is called *conning*.

BINAROS, a small town of Spain, in the kingdom of Valentia, remarkable for good wine. It is seated near the sea, in E. Long. 0. 15. N. Lat. 40. 24.

BINARY ARITHMETIC, that wherein unity or 1 and 0 are only used.—This was the invention of M. Leibnitz, who shews it to be very expeditious in discovering the properties of numbers, and in constructing tables: and Mr Dancourt, in the history of the royal academy of sciences, gives a specimen of it concerning arithmetical progressions; where he shews, that because in binary arithmetic only two characters are used, therefore the laws of progression may be more easily discovered by it than by common arithmetic. All the characters used in binary arithmetic are 0 and 1; and the cypher multiplies every thing by 2, as in the common arithmetic by 10. Thus 1 is one; 10, two; 11, three; 100, four; 101, five; 110, six; 111, seven; 1000, eight; 1001, nine; 1010, ten; which is built on the same principles with common arithmetic. The author, however, does not recommend this method for common use, because of the great number of figures required to express a number; and adds, that if the common progression were from 12 to 12, or from 16 to 16, it would be still more expeditious.

BINARY MEASURE, in music, is a measure which is beaten equally, or where the time of rising is equal to that of falling. This is usually called *common time*.

BINARY NUMBER, that composed of two units.

BINCHE, a small fortified town of the Low Countries, in the county of Hainault, subject to the house of Austria. E. Long. 3. 21. N. Lat. 50. 23.

BIND, a country-word for a stalk of hops.

BIND OF BELS, a quantity, consisting of 250, or 10 strikes, each containing 25 cels.

BIND-WEED, in botany. See CONVULVULUS.

BINDBROKE, a town of Lincolnshire in England, seated in E. Long. 0. 10. N. Lat. 53. 32.

BING, in the alum-works, denotes a heap of alum thrown

Bingazi
Bion.

thrown together in order to drain.

BINGAZI, a sea-port town of Africa, in the kingdom of Tripoli. E. Long. 19. 10. N. Lat. 32. 20.

BINGEN, an ancient and handsome town of Germany, in the archbishopric of Mentz, seated at the place where the river Nave falls into the Rhine. E. Long. 7. 48. N. Lat. 50. 3.

BINGHAM (Joseph), a learned divine, born at Wakefield in Yorkshire, in September 1668, educated at University college, in Oxford, and afterwards presented by John Radcliffe, M. D. to the rectory of Headbournworthy, near Winchester. In this country retirement he began his learned and laborious work, *Origines Ecclesiasticæ*; or, The Antiquities of the Christian church. The first volume of which was published in 1708, and it was completed afterwards in nine volumes more. He published also several other books. But notwithstanding his great learning and merit, he had no other preferment than that of Headbournworthy till the year 1712, when he was collated to the rectory of Havant, near Portsmouth, by Sir Jonathan Trelawney bishop of Winchester, to whom he dedicated several of his books. He died August 17th, 1723, in the 55th year his age.

BINGHAM, a town of Nottinghamshire in England, seated in the vale of Belvoir, in W. Long. 1. 10. N. Lat. 50. 3.

BINGIUM, (anc. geog.), a village or town of the Vangiones in Gallia Belgica, seated at the confluence of the Nave and Rhine. Now *Bingen*; which see.

BINGLEY, a town in the west riding of Yorkshire, seated on the river Aire, in W. Long. 1. 35. N. Lat. 53. 20.

BINN, in country affairs, a place boarded up to put corn in.

BINOCULAR TELESCOPE, a kind of dioptric telescope fitted with two tubes, joined in such a manner that one may see a distant object with both eyes at the same time. See OPTICS.

BINOMIAL, in algebra, a root consisting of two members connected by the sign + or —. Thus $a+b$, and $8-3$, are binomials, consisting of the sums and differences of these quantities. See ALGEBRA.

BINTAN, an island of Asia, in the East Indies, to the south of the peninsula of Malacca, situated in E. Long. 103. 50. N. Lat. 1. 0.

BIOGRAPHER, one who writes the lives of particular persons, as Plutarch, Suetonius, &c. See the next article.

BIOGRAPHY, a species of history which records the lives and characters of remarkable persons. This is at once the most entertaining and instructive kind of history. It admits of all the painting and passion of romance; but with this capital difference, that our passions are more keenly interested, because the characters and incidents are not only agreeable to nature, but strictly true. No books are so proper to be put into the hands of young people. See the *Preface* to this WORK.

BION, a bucolic poet, native of Smyrna, lived at the same time with Ptolemy Philadelphus, whose reign reached from the fourth year of the 123^d Olympiad to the second year of the 133^d. He was an incomparable poet, if we may believe the lamentations of his disciple Moschus. His few pieces which are left do not contradict this testimony. See MOSCHUS.

BION, surnamed *Doryllhenites*, because he was of Doryllhene, was a philosopher of a great deal of wit, but of very little religion: he flourished about the 120th Olympiad; but falling sick, he, like other profane persons, became superstitious.

BIORNBURG, a town of north Finland in Sweden, seated on the river Kunc near its mouth in the Gulf of Bothnia. E. Long. 22. 35. N. Lat. 62. 6.

BIOTHANATI, a term sometimes used for suicides. See SUICIDES.

BIOUAC, in military affairs, a night-guard, performed by the whole army, when there is any apprehension of danger from the enemy.

BIPENNIS, a two-edged ax, used anciently by the Amazons in fight; as also by the seamen, to cut asunder the ropes and cordage of the enemy's vessels. The bipennis was a weapon chiefly of the oriental nations, made like a double ax, or two axes joined back to back, with a short handle. Modern writers usually compare it to our halbard, or partizan; from which it differed in that it had no point, or that its shaft or handle was much shorter.

BIQUADRATIC POWER, ROOT, EQUATION, &c. See ALGEBRA.

BIR, or BERR, a town of the province of Diarbeck in Turkey in Asia, with a castle where the governor resides, seated on the eastern bank of the river Euphrates, near a high mountain in a very pleasant and fertile country. E. Long. 38. 6. N. Lat. 36. 10.

BIRAGUE (Clement), a Milanese engraver, and the inventor of the art of cutting diamonds, flourished about the year 1580.

BIRCH-TREE, in botany. See BETULA.

BIRD (William), an eminent musician and composer, was one of the children of the chapel in the reign of Edward VI. and, as it is asserted by Wood in the *Ashmolean MS.* was bred up under Tallis. It appears, that in 1575 Tallis and Bird were both gentlemen and also organists of the royal chapel; but the time of their appointment to this latter office cannot now be ascertained.

The compositions of Bird are many and various; those of his younger years were mostly for the service of the church. He composed a work, entitled *Sacrarum Cantionum, quinque vocum*, printed in 1589; among which is that noble composition *Civitas sancti tui*, which for many years past has been sung in the church as an anthem to the words "Bow thine ear, O Lord." He was also the author of a work entitled *Gradualia, ac Cantiones sacre, quinti, quaterni, trinique vocibus concinnate. lib. primus*. Of this there are two editions, the latter published in 1610. Although it appears by these his works that Bird was in the strictest sense a church-musician, he occasionally gave to the world compositions of a secular kind: and he seems to be the first among English musicians that ever made an essay in the composition of that elegant species of vocal harmony, the madrigal; the *La Verginella* of Ariosto, which he set in that form for five voices, being the most ancient musical composition of the kind to be met with in the works of English authors. Of his compositions for private entertainment, there are extant, 'Songs of fondry natures, some of grautic, and others of myrth, fit for all companies and voyces, printed in 1589,' and two other collections of the same kind, the last of them printed

printed in 1611. But the most permanent memorials of Bird's excellencies are his motets and anthems; to which may be added, a fine service in the key of D with the minor third, the first composition in Dr Boyce's Cathedral Music, vol. III. and that well known canon of his, *Non nobis Domine*.

Besides his salaries and other emoluments of his profession, it is to be supposed that Bird derived some advantages from the patent granted by queen Elizabeth to Tallis and him, for the sole printing of music and music-paper: Dr Ward speaks of a book which he had seen with the letters T. E. for Thomas East, Est, or Este, who printed music under that patent. Tallis dying in 1585, the patent, by the terms of it, survived to Bird, who, no doubt for a valuable consideration, permitted East to exercise the right of printing under the protection of it; and he in the title-page of most of his publications styles himself the *assignee of William Byrd*. Bird died in 1623.

BIRD, in zoology. See ZOOLOGY, n° 8.; COMPARATIVE-Anatomy, chap. iv.; and ORNITHOLOGY.

Beam-BIRD, or Petty-chaps. See MOTACILLA.

Black-BIRD.

Blue-BIRD.

Call-BIRD.

Canary-BIRD.

Dung-BIRD.

Humming-BIRD.

Mocking-BIRD.

BIRD of Paradise.

TURDUS.

MOTACILLA.

BIRD-Catching, infra.

FRINGILLA.

UPUFA.

TROCHILUS; also Plate

LVII. at fig. 3.

TURDUS.

PARADISEA.

BIRD-Call, a little stick cleft at one end, in which is put a leaf of some plant, wherewith to counterfeit the cryer's call of several birds, and bring them to the net, or snare, or lime-twigs, to be taken. A laurel-fitt fitted on the bird-call, counterfeits the voice of lapwings; a leek, that of nightingales, &c.

BIRD-Catching, the art of taking birds or wild-fowl, whether for food, for the pleasure of their song, or for their destruction as pernicious to the husbandman, &c. The methods are by bird-lime, nets, decoys, &c. See BIRD-Lime, infra; and Decoy.

In the suburbs of London (and particularly about Shoreditch) are several weavers and other tradesmen, who, during the months of October and March, get their livelihood by an ingenious, and, we may say, a scientific, method of bird-catching, which is totally unknown in other parts of Great Britain. The reason of this trade being confined to so small a compass, arises from there being no considerable sale for singing-birds except in the metropolis: as the apparatus for this purpose is also heavy, and at the same time must be carried on a man's back, it prevents the bird-catchers going to above three or four miles distance.

This method of bird-catching must have been long practised, as it is brought to a most systematical perfection, and is attended with a very considerable expence.

The nets are a most ingenious piece of mechanism; are generally twelve yards and a half long, and two

yards and a half wide; and no one, on bare inspection, would imagine that a bird (who is so very quick in all its motions) could be caught by the nets flapping over each other, till he becomes eye-witness of the pullers seldom failing.

The wild birds fly (as the bird-catchers term it) chiefly during the month of October, and part of September and November; as the flight in March is much less considerable than that of Michaelmas. It is to be noted also, that the several species of birds of flight do not make their appearance precisely at the same time, during the months of September, October, and November. The pipet (A), for example, begins to fly about Michaelmas; and then the woodlark, linnet, goldfinch, chaffinch, greenfinch, and other birds of flight succeed; all of which are not easily to be caught, or in any numbers, at any other time, and more particularly the pipet and the woodlark.

These birds, during the Michaelmas and March flights, are chiefly on the wing from day-break to noon, though there is afterwards a small flight from two till night; but this however is so inconsiderable, that the bird-catchers always take up their nets at noon.

It may well deserve the attention of the naturalist whence these periodical flights of certain birds can arise. As the ground, however, is ploughed during the months of October and March for sowing the winter and lent corn, it should seem that they are thus supplied with a great profusion both of seeds and insects, which they cannot so easily procure at any other season.

It may not be improper to mention another circumstance, to be observed during their sitting, viz. that they fly always against the wind: hence, there is great contention amongst the bird-catchers who shall gain that point; if (for example) it is westerly, the bird-catcher who lays his nets most to the east, is sure almost of catching every thing, provided his call-birds are good: a gentle wind to the south-west generally produces the best sport.

The bird-catcher, who is a substantial man, and hath a proper apparatus for this purpose, generally carries with him five or six linnets, (of which more are caught than any singing bird), two gold-finches, two green-finches, one wood-lark, one red poll, a yellow-hammer, tit-lark, and aberdavie, and perhaps a bull-finch; these are placed at small distances from the nets in little cages. He hath, besides, what are called *flur-birds*, which are placed within the nets, are raised upon the flur (a), and gently let down at the time the wild bird approaches them. These generally consist of the linnet, the gold-finch, and the green-finch, which are secured to the flur by what is called a *brace* (c); a contrivance that secures the birds without doing any injury to their plumage.

It having been found that there is a superiority between bird and bird, from the one being more in song than the other; the bird-catchers contrive that their call-birds should moult before the usual time. They, therefore, in June or July, put them into a close box,

(A) A small species of lark, but which is inferior to other birds of that genus in point of song.

(B) A moveable perch to which the bird is tied, and which the bird-catcher can raise at pleasure by means of a long string fastened to it.

(C) A sort of bandage, formed of a slender silken string that is fastened round the bird's body, and under the wings, in so artful a manner as to hinder the bird from being hurt, let it flutter ever so much in the raising.

Bird.

under two or three folds of blankets, and leave their dung in the cage to raise a greater heat; in which state they continue, being perhaps examined but once a-week to have fresh water. As for food, the air is so putrid, that they eat little during the whole state of confinement, which lasts about a month. The birds frequently die under the operation; and hence the value of a stopped-bird rises greatly. When the bird hath thus prematurely moulted, he is in song whilst the wild birds are out of song, and his note is louder and more piercing than that of a wild one; but it is not only in his note he receives an alteration, the plumage is equally improved. The black and yellow in the wings of the gold-finch, for example, become deeper and more vivid, together with a most beautiful gloss, which is not to be seen in the wild bird. The bill, which in the latter is likewise black at the end, in the stopped-bird becomes white and more taper, as do its legs: in short, there is as much difference between a wild and a stopped-bird, as there is between a horse which is kept in body-clothes or at grass.

When the bird-catcher hath laid his nets, he disposes of his call-birds at proper intervals. It must be owned, that there is a most malicious joy in these call-birds to bring the wild ones into the same state of captivity; which may likewise be observed with regard to the decoy-ducks. See DECOY.

Their sight, and hearing, infinitely excels that of the bird-catcher. The instant that the (v) wild birds are perceived, notice is given by one to the rest of the call-birds, (as it is by the first hound that hits on the scent, to the rest of the pack); after which, follows the same sort of tumultuous ecstasy and joy. The call-birds, while the bird is at a distance, do not sing as a bird does in a chamber; they invite the wild ones by what the bird-catchers call *short-jerks*, which, when the birds are good, may be heard at a great distance. The ascendancy by this call or invitation is so great, that the wild bird is stopped in its course of flight; and, if not already acquainted with the nets (E), lights boldly within 20 yards of perhaps three or four bird-catchers, on a spot which otherwise it would not have taken the least notice of. Nay, it frequently happens, that if half a flock only are caught, the remaining half will immediately afterwards light in the nets, and share the same fate; and should only one bird escape, that bird will suffer itself to be pulled at till it is caught; such a fascinating power have the call-birds.

While we are on this subject of the jerking of birds, we cannot omit mentioning, that the bird-catchers frequently lay considerable wagers whose call-bird can jerk the longest, as that determines the superiority. They place them opposite to each other, by an inch of candle; and the bird who jerks the soonest, before the candle is burnt out, wins the wager. We have been informed, that there have been instances of a bird's giving 170 jerks in a quarter of an hour; and we have known a linnet, in such a trial, persevere in its emulation till it swooned from the perch: thus, as Pliny says of the nightingale, *victa morte finit sepe vitam, spiritu prius deficiente quam cantu* *. It may be here observed, that

birds when near each other, and in light, seldom jerk or sing. They either fight, or use short and wheedling calls; the jerking of these call-birds, therefore, face to face, is a most extraordinary instance of contention for superiority in song.

To these we may add a few particulars that fell within our notice during our inquiries among the bird-catchers; such as, that they immediately kill the hens of every species of birds they take, being incapable of singing, as also being inferior in plumage; the pippets likewise are indiscriminately destroyed, as the cock does not sing well; they sell the dead birds for three-pence or four-pence a dozen. These small birds are so good, that we are surprised the luxury of the age neglects so delicate an acquisition to the table. The modern Italians are fond of small birds, which they eat under the common name of *beccaficos*; and the dear rate a Roman tragedian paid for one dish of singing-birds is well known; (see the article *Esop*).

Another particular we learned, in conversation with a London bird-catcher, was the vast price that is sometimes given for a single song-bird, which had not learned to whistle tunes. The greatest sum we heard of, was five guineas for a chaffinch, that had a particular and uncommon note, under which it was intended to train others: and we also heard of five pounds ten shillings being given for a call-bird linnet.

A third singular circumstance, which confirms an observation of Linnæus, is, that the male chaffinches fly by themselves, and in the flight precede the females; but this is not peculiar to the chaffinches. When the tit-larks are caught in the beginning of the season, it frequently happens, that forty are taken and not one female among them: and probably the same would be observed with regard to other birds, (as has been done with relation to the wheat-eat), if they were attended to. An experienced and intelligent bird-catcher informed us, that such birds as breed twice a-year, generally have in their first brood a majority of males, and in their second, of females, which may in part account for the above observation.

We must not omit mention of the bullfinch, though it does not properly come under the title of a singing-bird, or a bird of flight, as it does not often move farther than from hedge to hedge; yet, as the bird sells well on account of its learning to whistle tunes, and sometimes flies over the fields where the nets are laid, the bird-catchers have often a call-bird to ensnare it, though most of them can imitate the call with their mouths. It is remarkable with regard to this bird, that the female answers the purpose of a call-bird as well as the male, which is not experienced in any other bird taken by the London bird-catchers.

The nightingale is not a bird of flight, in the sense the bird-catchers use this term. Like the robin, wren, and many other singing birds, it only moves from hedge to hedge, and does not take the periodical flights in October and March. The persons who catch these birds, make use of small trap-nets, without call-birds; and are considered as inferior in dignity to other bird-catchers, who will not rank with them. The arrival of

the

(D) It may be also observed, that the moment they see a hawk, they communicate the alarm to each other by a plaintive note; nor will they then jerk or call though the wild birds are near.

(E) A bird, acquainted with the nets, is by the bird-catchers termed a *sharper*; which they endeavour to drive away, as they can have no sport whilst it continues near them.

the nightingale is expected by the trappers in the neighbourhood of London, the first week in April: at the beginning, none but cocks are taken; but in a few days the hens make their appearance, generally by themselves, though sometimes a few males come along with them. The latter are distinguished from the females not only by their superior size, but by a great swelling of their vent, which commences on the first arrival of the hens. They are caught in a net trap, the bottom of which is surrounded with an iron ring; the net itself is rather larger than a cabbage net. When the trappers hear or see them, they strew some fresh mould under the place, and bait the trap with a mealworm from the baker's shop. Ten or a dozen nightingales have been thus caught in a day.

BIRD-LIME, a viscid substance, prepared after different ways. The most common bird-lime among us, is made from holly-bark, boiled ten or twelve hours; when the green coat being separated from the other, it is covered up a fortnight in a moist place; then pounded into a tough paste, so that no fibres of the wood are discernible, and washed in a running stream till no motes appear; put up to ferment four or five days, skimmed as often as any thing arises, and laid up for use. To use it, a third part of nut-oil, or thin grease, must be incorporated with it over the fire.

The juice of holly-bark, is a very peculiar substance. But if trials were made, it seems probable, that many other juices would be found to have the same clammy nature. The mistletoe affords a juice, even superior to that of the holly; and if a young shoot of the common alder be cut through, there will a stringy juice draw out in threads, and follow the knife like bird-lime, or the juice of the holly. It seems in this tree to be lodged, not in the bark, but in certain veins just within the circle of the wood. The roots of all the hyacinths also afford a tough and stringy juice of the same kind; and so does the asphodel, the narcissus, and the black bryony root, in a surprising quantity.

When twigs, &c. smeared with bird-lime are to be put in places subject to wet, the common bird-lime is apt to have its force soon taken away. It is necessary, therefore, to have recourse to a particular sort, which from its property of bearing water unharmed, is called *water bird-lime*; and is prepared thus. Take a pound of strong and good bird-lime; wash it thoroughly in spring-water, till the hardcoats are all removed; and then beat it well, that the water may be clean separated, so as not a drop remains; then dry it well, and put it into an earthen pot; add to it as much capon's grease as will make it run. Then add two spoonfuls of strong vinegar, one spoonful of oil, and a small quantity of Venice turpentine. Let the whole boil for some minutes over a moderate fire, stirring it all the time. Then take it off; and when there is occasion to use it, warm it, and cover the sticks well with it. This is the best sort of bird-lime for snipes, and other birds that love wet places.

The most successful method of using the common bird-lime is this: Cut down the main branch or bough of any bushy tree, whose twigs are thick, straight, long, and smooth, and have neither knots nor prickles. The willow and the birch-tree afford the best of this kind. Let all the superfluous shoots be trimmed off, and the

twigs all made neat and clean; they must all be well covered with the bird-lime, within four inches of the bottom; but the main bough from which they grow, must not be touched with the lime. No part of the bark, where the lime should come, must be left bare; but it is a nice matter to lay it on properly; for if it be too thick it will give the birds a distaste, and they will not come near it; and if there be too little of it, it will not hold them when they are there. When the bush is thus prepared, it must be set up in some dead hedge, or among some growing bushes near the outskirts of a town, a farmer's back-yard, or the like, if it be in the spring; for these places are the resort of the small birds at that time. If it be used in summer, the bush must be placed in the middle of a quick-set hedge, or in groves, bushes, or white-thorn trees, near fields of corn, hemp, flax, and the like; and in the winter, the proper places are about stacks of corn, hovels, barns, and the like. When the lime-bush is thus planted, the sportsman must stand as near it as he can, without being discovered; and with the mouth, or otherwise, make such sort of notes as the birds do when they attack or call to one another. There are bird-calls to be bought for this use; but the most expert method is to learn the notes of call of the several birds, and imitate them by a sort of whistling. When one bird is thus enticed to the bush, and hung fast, the business of the sportsman is not to run up to take it, but to be patient: for it will hang itself more fast, by its struggling to get away; and its fluttering will bring more to the bush, so that several may be taken together. The time of the day for this sport is from sun-rise to ten o'clock, and from one to sun-set. Another very good method of bringing the birds together, is by a stake: a bat makes a very good stake; but it must be fastened, so as to be in sight at a distance. An owl is a still better stake; for this bird never goes abroad, but it is followed by all the small birds in the neighbourhood. They will gather together in great numbers about it; and having no convenient place to sit on, but the lime-bush, will be taken in great numbers. If a living owl or bat is not to be had, the skin stuffed will serve the purpose, and will last 20 years. Some have used the image of an owl carved in wood, and painted in the natural colours; and it has been found to succeed very well.

Divination by BIRDS.

Migration of BIRDS.

Nidification of BIRDS.

Singing of BIRDS.

See { AUGURY.
MIGRATION.
ORNITHOLOGY.
SINGING.

Methods of preserving BIRDS from putrefaction, and so as to retain their natural form and position, as well as the beauty of their colours and plumage. A good antiseptic for animal substances has been much inquired after; as, for want of it, many curious animals, and birds particularly, come to our hands in a very imperfect state; some from foreign parts entirely miscarry, and others of the finest plumage are devoured by insects. Various methods of preservation, therefore, have been of late described†; but the following improved methods by Dr Lettome* seem to be the least troublesome and the most complete.

“After opening the bird by a longitudinal incision from the breast to the vent; dissecting the fleshy parts from the bones; and removing the entrails, eyes, brains, &c.

† See Phil. Transf. for 1770, p. 185, 302.

* Naturalist's and Traveller's Companion, p. 12. et seq.

Bird.

brains (r), and tongue; the cavities and inside of the skin are to be sprinkled with the powders mentioned below: the eyes (g) are then to be inferted, and the head stuffed with cotton or tow: in the next place, a wire is to be passed down the throat through one of the nostrils, and fixed into the breast-bone: wires are also to be introduced through the feet, up the legs and thighs, and inferted into the same bone: next, fill the body with cotton to its natural size, and sew the skin over it: the attitude is lastly to be attended to; and in whatever position the subject is placed to dry, that same position will be retained afterwards.

"The drying compound is as follows:

Corrosive sublimate,	-	$\frac{1}{4}$ lb.
Saltpetre prepared or burnt,	-	$\frac{1}{2}$ lb.
Alum burnt,	-	$\frac{1}{2}$ lb.
Flowers of sulphur,	-	$\frac{1}{2}$ lb.
Camphor,	-	$\frac{1}{4}$ lb.
Black pepper,	-	1 lb.
Tobacco ground coarse,	-	1 lb.

Mix the whole together, and keep it in a glass vessel stopp'd close.

"Small birds may be preserved in brandy, rum, arrack, or first runnings; though in this manner the colour of the plumage is liable to be extracted by the spirit.

"Large sea-fowl have thick, strong skins, and such may be skinned; the tail, claws, head, and feet, are carefully to be preserved, and the plumage stained as little as possible with blood. The inside of the skin may be stuffed as recommended above.

"Kuckahn observes †, that 'baking is not only useful in fresh preservations, but will also be of very great service to old ones, destroying the eggs of insects; and it should be a constant practice once in two or three years to bake them over again, and to have the cases fresh washed with camphorated spirit, or the sublimate solution, which would not only preserve collections from decay much longer, but also keep them sweet.'

"One of the best preservatives, is to procure close boxes, well glazed: with such a precaution I have kept them in a dry room many years without the least appearance of injury.—Baking is apt to crimp and injure the plumage, unless great care be used; and therefore the proper degree of heat should be ascertained by means of a feather, before such subjects are baked.

"When the subject is to be kept for some time in a hot climate, it should be secured in a box filled with tow, oakum, or tobacco, well sprinkled with the sublimate solution."

In Guiana, the number and variety of beautiful birds is so great, that several persons in the colony advantageously employ themselves, with their slaves and dependents, in killing and preserving these animals for the cabinets of naturalists in different parts of Europe. The method of doing this, as related by Mr Bancroft *, is, "to put the bird which is to be preserved in a proper vessel, and cover him with high wines, or the first running of the distillation of rum. In this spirit he is suffered to remain for 24 or 48 hours, or longer, ac-

cording to his size, till it has penetrated through every part of his body. When this is done, the bird is taken out; and his feathers, which are no ways changed by this immersion, are placed smooth and regular. It is then put into a machine, made for the purpose, among a number of others, and its head, feet, wings, tail, &c. are placed exactly agreeable to life. In this position they are all placed in an oven, very moderately heated, where they are slowly dried; and will ever after retain their natural position, without danger of putrefaction."

*Mr Edwards Recipe for making Pictures of BIRDS, with their natural feathers.** First, take a thin board, or pannel of deal, or waincoat well seasoned, that it may not shrink; then smoothly paste on it white paper, and let it dry; and if the wood casts its colour thro', you may paste on a second paper, and it will be whiter: let the second paper dry; then get ready any bird that you would represent, and draw it as exact as may be on your papered pannel, of its natural size, (middle-sized birds are best for this work); then paint what ground-work, or tree, or other thing, you design to set your bird on, together with the bill and legs of the bird in water-colours, leaving the bird to be covered with its own natural feathers. You must first prepare the part to be feathered, by laying on pretty thick gum Arabic, dissolved in water, with a large hair-pencil; then lay the pannel flat, and let it dry hard; and when dry, cover it with your gum-water a second time, and let it dry; and then a third, in case you do not find it lie with a good body on the paper; the thickness of a shilling, when dried hard, is sufficient. When your piece is thus prepared, take the feathers off from your bird, as you use them; beginning always at the tail, and points of the wing, and working upwards to the head; observing to cover that part of your draught with the feather, that you take from the same part in your bird, letting them fall one over another in their natural order: you must prepare your feathers by cutting off the downy part that is about their bottoms; and the larger feathers must have the insides of their shafts shaved off with a knife to make them lie flat; the quills of the wings must have their inner webs clipped off, that in laying them the gum may hold them by their shafts. When you begin to lay them, take a pair of steel pliers to hold the feathers in; and have some gum-water, not too thin, and a large pencil, ready to moisten the gummed ground-work by little and little as you work it: then lay your feathers on the moistened parts; which must not be waterish, but something tacky or clammy to hold the feathers. You should prepare a parcel of small leaden weights, in the form of fugar-loaves; which you may cast in sand, by first making holes in its surface with a pointed stick: these weights will be necessary to set on the feathers you have newly layed on, to hold them to the gum till they are dry and fixed: but you must be cautious lest the gum come through the feathers; for it not only smears them, but dries to the bottoms of the weights, and you will be apt to pull off the feathers with the weights, which will disorder your work:

when

(f) In large birds, the brains may be extracted by the eyes; the best instrument for this purpose is a director used by surgeons, which may be had of an instrument-maker at a trifling expence.

(g) Wax (used by some) is not a proper substance for eyes; there are persons in London, whose business it is to make glass-eyes of any size or colour, at a penny or two-pence a pair.

* Nat. of Birds, Vol. 1, p. 119

† Phil. Transf. Vol. LX, p. 379.

* Natural History of Guiana.

when you have wholly covered your bird with feathers, you must with a little thick gum stick on a piece of paper cut round, of the bigness and in the place of the eye, which you must colour like the eye of the bird. When the whole is dry, dress the feathers round the out-line that may chance to stare a little, and rectify what may be mended in any other part: then lay a sheet of clean paper on it; and on that a heavy book, or some such thing, to press it: after which it may be preserved in a frame covered with a glass.

BIRDS, in heraldry, according to their several kinds, represent either the contemplative or active life. They are the emblems of liberty, expedition, readiness, swiftness, and fear. They are more honourable bearings than fishes, because they participate more of air and fire, the two noblest and highest elements, than of earth and water.—Birds must be borne in coat-armour, as is best fitting the propriety of their natural actions of going, sitting, standing, flying, &c. Birds that are either whole footed, or have their feet divided, and yet have no talons, are said to be *membered*; but the cock, and all birds of prey with sharp and hooked beaks and talons for encounter or defence, are termed *armed*. In the blazoning of birds, if their wings be not displayed, they are said to be borne close; as, *he beareth an eagle*, &c. close.

BIRDS-NESTS, in cookery, the nest of a small Indian swallow, very delicately tasted, and frequently mixed among soups. On the sea-coasts of China, at certain seasons of the year, there are seen vast numbers of these birds; they leave the inland country at their breeding time, and come to build in the rocks, and fashion their nests out of a spongy matter, which they find on the shore, washed thither by the waves. The nature of this substance is not yet ascertained. According to Kæmper, it is mollusc or sea-worms; according to M. le Poivre, fish-spawn; and according to Dalrymple, sea-weeds. The nests are of a hemispheric figure, and of the size of a goose's egg, and in substance much resemble the ichthyocolla or *isinglass*. The Chinese gather these nests, and sell them to all parts of the world; they dissolve in broths, &c. and make a kind of jelly of a very delicious flavour.

BIREMIS, in Roman antiquity, a vessel with two rows of oars; concerning the disposition of which authors are not agreed.

BIRETUM, or BIRRETUM, a sort of black bonnet, or covering of the head, in form of a pyramid, much used in Italy and France, about 500 or 600 years ago, as a badge of victory, honour, or sacerdotal preference.

BIRKENHEAD, or BERKENHEAD (Sir John), a famous political author, born about the year 1615. Being recommended to Dr William Laud archbishop of Canterbury, he became his secretary; in which office he shewed such capacity and diligence, that the archbishop, by his diploma, created him master of arts in 1639; and in the year following, by letter commendatory from the same prelate, he was chosen probationer fellow of All-Soul's College. This obliged him to reside constantly at Oxford; and on King Charles I.'s making that city his head-quarters during the civil war, our author was made choice of to write a kind of journal in defence of the royal cause, by which he gained great reputation. By his majesty's recommen-

dation, he was chosen reader in moral philosophy; which employment he enjoyed till 1648, when he was expelled by the parliament visitors. He retired afterwards to London, where he wrote several poetical pieces; and having adhered steadily to his principles, he acquired the title of the *loyal poet*, and suffered several imprisonments. He published, while he thus lived in obscurity, some very satirical compositions, mostly levelled against the republican grandees, and written with great poignancy. Upon the restoration of King Charles II. our author was rewarded for his loyalty. He was created, April 6th, 1661, on the king's letters sent for that purpose, doctor of the civil law by the university of Oxford; and in that quality, as an eminent civilian, was consulted by the convocation on the question, Whether bishops ought to be present in capital cases. He was about the same time elected to serve in parliament for Wilton, in the county of Wilts. He was knighted November 14th, 1662; and upon Sir Richard Fanshawe's going in a public character to the court of Madrid, he was appointed to succeed him as master of requests. He lived afterwards in credit and esteem, and received various favours from the court, which, however, drew upon him some very severe attacks from those who opposed the court. Mr Wood has treated him with great severity; but his memory has been transmitted with honour to posterity by others, particularly by Dryden, Langbaine, and Winstanly. He died in Westminster, December 4th, 1679; and was interred in St Martin's in the Fields.

BIRKENFIELD, a town of Germany, capital of a county of the same name in the circle of the Upper Rhine. It is seated near the river Nave, in E. Long. 7. 9. N. Lat. 49. 35.

BIRMINGHAM, a very large town of Warwickshire in England, situated in W. Long. 1. 35. N. Lat. 52. 30. It is no corporation, being only governed by two constables and two bailiffs; and it is therefore free for any person to come and settle there; which has contributed greatly not only to the increase of the buildings, but also of the trade, which is the most flourishing of any in England for all sorts of iron work besides many other curious manufactures. The town stands on the side of a hill, nearly in the form of a half-moon. The lower part is filled with the workshops and warehouses of the manufacturers, and consists chiefly of old buildings. The upper part of the town contains a number of new and regular streets, and a handsome square elegantly built. It has two churches, one in the lower part of the town, which is an ancient building with a very tall spire: the other is a very grand modern structure, having a square stone tower with a cupola and turret above it. The houses in this town amount to between 6000 and 7000, and their number is continually increasing.

BIRON (Armand de Gontault, lord of), marshal of France, and a celebrated general in the 16th century, signalized himself by his valour and conduct in several sieges and battles. He was made grand master of the artillery in 1569, and no body dared to assault him at the massacre of St Bartholomew. He was the first who declared for Henry IV. He brought a part of Normandy under his subjection, and dissuaded him from retreating to England or Rochelle. But he was killed by a cannon-ball, at the siege of Epernay, on the 26th of July.

Birota
Bira.

July, 1592. He was a very universal scholar : and used to carry a pocket-book, in which he wrote down every thing that appeared remarkable ; which gave rise to a proverb very much used at court : When a person happened to say any thing uncommon, they told him, *Tou have found that in Biron's pocket-book.*

BIROTA, or BIKOTUM, in Roman antiquity, a kind of vehicle, so denominated from its moving upon two wheels. It carried about 200 pound weight, and was drawn by three mules.

BIRRUS, in Roman antiquity, a cloak, made of woollen cloth, worn by the soldiers. Also a robe anciently worn by the priests or bishops.

BIRTH, in midwifery, signifies the same with delivery. See MIDWIFERY.

BIRTH, or *Berth*, the station in which a ship rides at anchor, either alone or in a fleet ; or the distance between the ship and any adjacent object ; comprehending the extent of the space in which she ranges at the length of her cables : as, *she lies in a good berth*, i. e. in a convenient situation, or at a proper distance from the shore and other vessels ; and where there is good anchoring-ground, and shelter from the violence of the wind and sea.

BIRTH also signifies the room or apartment where any particular number of the officers or ship's company usually mess and reside. In a ship of war there is commonly one of these between every two guns.

BIRTH-DAY, the anniversary return of the day whereon a person was born. The ancients placed a good deal of religion in the celebration of birth-days, and took omens from thence of the felicity of the coming year. The manner of celebrating birth-days was by a splendid dress ; wearing a sort of rings peculiar to that day ; offering sacrifices, the men to their genius, of wine, frankincense ; the women to Juno ; giving suppers, and treating their friends and clients ; who, in return, made them presents, wrote and sung their panegyrics, and offered vows and good wishes for the frequent happy returns of the same day. The birth-days of emperors were also celebrated with public sports, feasts, vows, and medals struck on the occasion.—But the ancients, it is to be observed, had other sorts of birth-days besides the days on which they were born. The day of their adoption was always reputed as a birth-day, and celebrated accordingly. The emperor Adrian, we are told, observed three birth-days ; viz. the day of his nativity, of his adoption, and of his inauguration. In those times it was held, that men were not born only on those days when they first came into the world, but on those also when they arrived at the chief honours and commands in the commonwealth, *e. gr.* the consulate. Hence that of Cicero in his oration *ad Quirites*, after his return from exile : *A parentibus, id quod necesse erat, parvus sum procreatus ; a vobis natus sum consularis.*

BIRTH-WORT, in botany. See ARISTOLOCHIA.

BIRVIESCA, a town of Old Castile in Spain, and capital of a small territory called *Bureva*. W. Long. 2. 15. N. Lat. 56. 35.

BIRZA, a town of Poland in the province of Samogitia. E. Long. 25. 5. N. Lat. 56. 35.

BISA, or BIZA, a coin of Pegu, which is current there for half a ducat. It is also a weight used in that kingdom.

BISACCIA, a small handsome town of Italy, in the Ulterior Principato, and in the kingdom of Naples, with a bishop's see. E. Long. 15. 35. N. Lat. 41. 3.

BISCARA, a town of Africa, in the kingdom of Algiers, seated in the eastern or Levantine government, in E. Long. 5. 50. N. Lat. 35. 10. This city belonged to the province of Zeb in Numidia, which lies south of the kingdom of Labez ; but the Algerines, in their annual inroads to carry off slaves, made themselves masters of Biscara, in order to facilitate their entrance into the southern provinces. It retains still some remains of the ancient city that gave name to this territory ; and hath a garrison to keep the inhabitants in awe, and who usually bring lions, tigers, and other wild beasts for sale to strangers. The city of Algiers is never without a great number of Biscarans, who are employed in the hardest and lowest offices, as cleaning of streets, emptying of vaults, sweeping chimneys, &c. ; and when they have got about 10 or 12 crowns by this drudgery, they return to their country, where they are respected as worthy men on account of their money, the inhabitants of this province being almost entirely destitute of coin, and reckoned the most miserable of all the Arabian tribes.

BISCAY, a province of Spain, bounded on the north by the sea called the *Bay of Biscay*, on the south by Old Castile, on the west by Asturias of Santilana, and on the east by the territories of Alava and Guipuscoa. It is in length about seventy-four miles ; but the breadth is much less, and very unequal. This country in general is mountainous and barren ; but in some places it produces corn, and every where a great quantity of apples, oranges, and citrons. They make cyder with the apples, which is their common drink. Besides this, they have wine called *chacolino*, which is pleasant, but will not keep long, and therefore is used instead of small-beer. Their valleys produce a little flax, and their hills a great deal of timber for ships. The sea affords them excellent fish of all sorts. The wool that is exported here comes from Old Castile ; but their greatest riches are produced by their mines of iron, which metal is extremely good, and is transported to all parts. They have likewise artificers that work in iron, and are, in particular, famous for working swords and knives. The natives of this province, who are of Celtic extraction, still retain their old laws, customs, and language. They are active, industrious, brave, hardy, choleric, and make the best soldiers and sailors in all Spain. Some say their language has no analogy with any now spoken in Europe. The chief towns in it are Bilbao, Ordunna, Durango, Fontarabia, St Sebastian, Tolosa, and Victoria.

BISCAY (New), a province of North America, in the audience of Guadalupe. It has New Mexico on the north, Culiacan on the west, Zacatecas on the south, and Panuca, with Florida, on the east. It is about 300 miles from east to west, and 360 from north to south. In general it is well watered, fruitful, moderately temperate, and abounds in all sorts of provisions, except the mountains of Topia, which are barren. The original inhabitants are not all brought under subjection, they having four large towns in the morasses, that are of difficult access ; for this reason the Spaniards have built three small fortified towns, which

are

are well inhabited, for the defence of their silver mines. The latitude is from 25 to 28 degrees.

BISCHOFISHEIM, a town of Germany, in the archbishoprick of Mentz, and circle of the Lower Rhine, seated on the river Tauber, near the frontiers of Franconia, E. Long. 9. 37. N. Lat. 49. 40.

BISCHOFF-ZELL, a town of Switzerland, belonging to the bishop of Constance. There is a castle wherein the bishop's bailiff resides, who receives half the fines; but he has nothing to do with the town, nor is there any appeal from the council of the town. It is seated on the Thur, at the place where the Sitter falls into this river, almost half way between Constance and St Gall. E. Long. 9. 23. N. Lat. 47. 33.

BISCHWELLER, a fortress of Alsace, seated in E. Long. 7. o. N. Lat. 48. 40.

BISCHROMA, in music, the same as our triple quaver. See **CHROMA**.

BISCUTELLA, **BUCKLER-MUSTARD**, or *Bastard Mithridate-mustard*; a genus of the tetradynamia order, belonging to the filiculosa class of plants. Of this there are three species; the auriculata, with small pods joined to the style; the didyma, with a double orbicular pod diverging from the style; and the apula, with flowers growing in spikes and a shorter style. They are natives of France, Italy, and Germany.

BISEGLIA, a populous town of Italy, in the kingdom of Naples and Terra de Bari, with a bishop's see, seated near the Gulf of Venice, in E. Long. 16. 49. N. Lat. 41. 18.

BISERRULA, a genus of the decandria order, belonging to the diadelphica class of plants, for which there is no English name. Of this genus there is only one species known, viz. the pelecus, an annual plant with purple flowers, growing in Italy, Sicily, Spain, and the south of France.

BISERTA, a town of the kingdom of Tunis in Africa, seated on a gulf of the same name, in E. Long. 10. 40. N. Lat. 37. 20. The gulf is a very large one, and the *Sinus Hipponensis* of the ancients. It is formed by the Capes Blanco and Ziebeh; and has a beautiful sandy inlet near four leagues wide, which once admitted the largest vessels, but through the negligence of the Turks can now admit only those of the smallest size, and is in danger in a short time of being totally choaked up. Some remains of the great pier of Hippo are still extant; by which it appears to have run out into the sea so as to break the north-east wind, and make this one of the safest and most beautiful havens in these parts. On the fourth, this gulf hath a communication with a lake of the same name, so as to form a kind of canal between it and the Mediterranean sea. Through this canal a constant stream is observed alternately discharging itself from the sea to the lake, and from the lake to the sea, in the same manner as the Atlantic ocean is observed to do in the Mediterranean, and back again; so that what the lake loses by exhalations is soon recruited by the sea, which in hot seasons runs into it with a very brisk current to keep up the equilibrium. The town was formerly very considerable; and, though not above a mile in circuit, is said to have contained 6000 houses; whereas both it and the villages under it now scarce contain that number of inhabitants. It has still, however, some strong castles and batteries to defend it, especially towards the sea. There are also

two very capacious prisons for slaves, a large magazine or ware-house for merchandize, and two towers with some other outworks to defend the entrance of the haven. The city, though so near the sea, is well supplied with fresh water from springs that surround it on every side towards the land. It is likewise well furnished with variety of fish from the adjacent lake. Most of the inhabitants of Biserta, as well as of the adjacent country on both sides of the canal, are employed in the fishing trade, which begins about the end of October, and ends in the beginning of May; for the rains then sweetening the waters, make the fish come into it in vast quantities during that season; but afterwards they either disappear, or grow lean, dry, and unfit to eat.

The people here are extremely poor; yet very proud, ill natured, and faithless; inasmuch that Muley Hafun Bey, one of their sovereigns, used to say, that none of his subjects deserved his resentment so much as they, since neither fear nor love could keep them faithful.—Biserta hath about eight villages under its government; a large plain called *Matter* or *Mater*; and the territory of Chloros, the *Clypea* or *Corobis* of the ancients. This is a tract of great extent, and would be very fertile were it not for the frequent incursions of the Arabs. The people are very poor, live meanly, and go worse clad. Their choicest dainties is their couscou, a kind of cake made of flour, eggs, and salt, which they dry and keep all the year round. Their dress is nothing else than a piece of coarse cloth wrapped round their bodies, and another round their heads by way of a turban; and most of them go barefooted and barelegged. The poorer sort have nothing but a few skins laid on the floor to sleep upon; but the rich have narrow couches fixed against the wall, about five or six feet high, to which they mount by a ladder. They are very expert horsemen, as most in these countries are, and ride without saddle or bridle; nor do they ever shoe their horses. They are still more miserable from the neighbourhood of the Arabs, who living altogether by plunder, robbery, and murder, oppress the poor inhabitants with their frequent inroads and cruel exactions. The Bisertines, both of the city and country, are the most superstitious people in Barbary, scarce going any where without hanging a quantity of amulets about their own, or, if they ride, their horses neck also. These amulets are only scrapes of parchment or paper with some strange characters written upon them, which they sew up in a piece of leather, silk, &c. and imagine when worn about them to be a preservative against all accidents.

BISHOP, (in Greek *ἐπίσκοπος*, *Overseer*, or *Superintendent*), is the highest ecclesiastical dignitary, the chief officer in the hierarchy or æconomy of church-government. The apostles, after our Saviour's ascension, went forth preaching the gospel in the particular provinces allotted to them; and appointed the first converts of every place through which they passed, or, as Clemens Romanus expresses it, *the first fruits of their ministry*, to be the bishops and deacons of the churches planted by them. Thus Tertullian says, Clemens was ordained bishop of Rome by St Peter, and Polycarp bishop of Smyrna by St John.

There appears to have been but one bishop in a church; the titles of which supreme officer are reckoned up by Cyprian, and are, *Bishop*, *President*, *Pastor*, *Governor*, *Superintendent*, and *Priest*. And, as there

Biserta,
Bishop.

Bishop.

was but one bishop to a church, so there was but one church to a bishop; as appears from hence, that the ancient dioceses are never said to contain *churches* in the plural, but only a *church* in the singular: for authors speak of the church of Corinth, the church of Smyrna, the church of Philadelphia, the church of Antioch, &c. The word *diocese*, by which a bishop's flock is now usually expressed, is never used in that sense by the writers of the three first centuries: but the bishop's cure is frequently denoted by the word *παροικία*, *parish*; as appears from the synodical epistle of Irenæus to pope Victor, and from numberless places of Eusebius's Ecclesiastical History, which speaks of the bishops of the parish of Alexandria, of the parish of Ephesus, of the parish of Corinth, of the parish of Athens, of the parish of Carthage, &c. denoting the very same thing, which we now mean by the word *parish*; viz. a competent number of Christians, dwelling near together, having one bishop, or *pastor*, set over them.

The peculiar acts of the episcopal function were, preaching the word, praying with his people, administering the two sacraments of baptism and the eucharist, taking care of the poor, ordaining of ministers, governing his flock, excommunicating offenders, absolving of penitents. To the constant discharge of these offices the primitive bishops sedulously applied themselves; to which purpose they resided constantly on their cures: indeed, residence on their parishes was deemed so necessary, that Cyprian, enumerating the sins which brought the wrath of God on the church in the bloody persecution of Decius, mentions the non-residence of the bishops as one.—If we inquire into the peculiar powers and privileges of the ancient bishops, we shall find, first, that they had a liberty of framing their own liturgies, only keeping to the analogy of faith and sound doctrine; to express the same creed in different forms; and to appoint days of fasting in their particular churches. They were allowed to sit and judge in secular causes, when appealed to as arbitrators of mens differences; and Constantine made a law to confirm all such decisions of bishops in their consistories. There are two laws, of Arcadius and Honorius, to the same purpose; but with these two limitations, viz. that they should only have power to judge when both parties agreed by consent to refer their causes to their approbation; and that they should not be allowed to judge in criminal causes, where life and death might be concerned. To these privileges we may add that of disposing of the revenues of the church. There are several canons to this purpose. The apostolical constitution speak of this power; and Cyprian observes, that all, who received maintenance from the church, had it, *Episcopo dispensante*, by order and appointment of the bishop. For this purpose he had his *oconomus*, or *steward*, which some canons order to be one of the clergy of every church. Such was the state of episcopacy in the primitive Christian church; which did not long continue such: for dioceses, in after times, became enlarged, and comprehended several *παροικίας*, or *parishes*; the bishops degenerated from their original and apostolical simplicity; and wealth, power, and grandeur, began to distinguish the episcopate from the inferior orders of the hierarchy.

A bishop, or an archbishop (see ARCHBISHOP), is elected by the chapter of his cathedral church, by vir-

tue of a license from the crown. Election was, in very early times, the usual mode of elevation to the episcopal chair throughout all Christendom; and this was promiscuously performed by the laity as well as the clergy: till at length, it becoming tumultuous, the emperors and other sovereigns of the respective kingdoms of Europe took the appointment in some degree into their own hands; by referring to themselves the right of confirming these elections, and of granting investiture of the temporalities, which now began almost universally to be annexed to this spiritual dignity; without which confirmation and investiture, the elected bishop could neither be consecrated nor receive any secular profits. This right was acknowledged in the emperor Charlemagne, A. D. 773, by pope Hadrian I. and the council of Lateran, and universally exercised by other Christian princes: but the policy of the court of Rome at the same time began by degrees to exclude the laity from any share in these elections, and to confine them wholly to the clergy, which at length was completely effected; the mere form of election appearing to the people to be a thing of little consequence, while the crown was in possession of an absolute negative, which was almost equivalent to a direct right of nomination. Hence the right of appointing to bishoprics is said to have been in the crown of England (as well as other kingdoms in Europe) even in the Saxon times; because the rights of confirmation and investiture were in effect (though not in form) a right of complete donation. But when, by length of time, the custom of making elections by the clergy only was fully established, the popes began to except to the usual method of granting these investitures, which was *per annulum et baculum*, by the prince's delivering to the prelate a ring and pastoral staff or *crozier*; pretending, that this was an encroachment on the church's authority, and an attempt by these symbols to confer a spiritual jurisdiction: and pope Gregory VII. towards the close of the eleventh century, published a bull of excommunication against all princes who should dare to confer investitures, and all prelates who should venture to receive them. This was a bold step towards effecting the plan then adopted by the Roman see, of rendering the clergy entirely independent of the civil authority: and long and eager were the contests occasioned by this papal claim. But at length, when the emperor Henry V. agreed to remove all suspicion of encroachment on the spiritual character, by conferring investitures for the future *per sceptrum*, and not *per annulum et baculum*; and when the kings of England and France consented also to alter the form in their kingdoms, and receive only homage from the bishops for their temporalities, instead of investing them by the ring and crozier; the court of Rome found it prudent to suspend for a while its other pretensions.

This concession was obtained from king Henry I. in England, by means of that oblate and arrogant prelate archbishop Anselm: but king John (about a century afterwards) in order to obtain the protection of the pope against his discontented barons, was also prevailed upon to give up by a charter, to all the monasteries and cathedrals in the kingdom, the free right of electing their prelates, whether abbots or bishops: reserving only to the crown the custody of the temporalities during the vacancy; the form of granting a license

cence to elect, (which is the original of our *conge d'effire*), on refusal whereof the electors might proceed without it; and the right of approbation afterwards, which was not to be denied without a reasonable and lawful cause. This grant was expressly recognized and confirmed in king John's *magna carta*, and was again established by statute 25 Edw. III. ft. 6. § 3.

But by statute 25 Hen. VIII. c. 20. the ancient right of nomination was, in effect, restored to the crown: it being enacted, that, at every future avoidance of a bishopric, the king may send the dean and chapter his usual licence to proceed to election; which is always to be accompanied with a letter missive from the king, containing the name of the person whom he would have them elect: and, if the dean and chapter delay their election above twelve days, the nomination shall devolve to the king, who may by letters patent appoint such person as he pleases. This election or nomination, if it be of a bishop, must be signified by the king's letters patent to the archbishop of the province; if it be of an archbishop, to the other archbishop and two bishops, or to four bishops; requiring them to confirm, invest, and consecrate the person so elected: which they are bound to perform immediately, without any application to the sec. of Rome. After which the bishop elect shall sue to the king for his temporalities, shall make oath to the king and none other, and shall take restitution of his secular possessions out of the king's hands only. And if such dean and chapter do not elect in the manner by this act appointed, or if such archbishop or bishop do refuse to confirm, invest, and consecrate such bishop elect, they shall incur all the penalties of a *præmunire*.

The dean and chapter having made their election, the archbishop, by the king's direction, confirms the bishop, and afterwards consecrates him, by imposition of hands, according to the form laid down in the Common-Prayer book. Hence we see that a bishop differs from an archbishop in this, that an archbishop with bishops consecrates a bishop, as a bishop with priests consecrates a priest: other distinctions are, that an archbishop visits a province, as a bishop a diocese; that an archbishop convokes a provincial synod, as a bishop does a diocesan one; and that the archbishop has canonical authority over all the bishops of his province, as a bishop has over the priests of his diocese.

The power and authority of a bishop, besides the administration of certain holy ordinances peculiar to that sacred order, consist principally in inspecting the manners of the people and clergy, and punishing them in order to reformation, by ecclesiastical censures. To this purpose he has several courts under him, and may visit at pleasure every part of his diocese. His chancellor is appointed to hold his courts for him, and to assist him in matters of ecclesiastical law; who, as well as all other ecclesiastical officers, if lay or married, must be a doctor of the civil law, so created in some university. It is also the business of a bishop to institute, and to direct induction, to all ecclesiastical livings in his diocese.

Archbishoprics and bishoprics may become void by death, deprivation for any very gross and notorious crime, and also by resignation. All resignations must be made to some superior. Therefore a bishop must resign to his metropolitan; but the archbishop can re-

sign to none but the king himself.

All bishops of England are peers of the realm, except the bishop of Man; and, as such, fit and vote in the House of Lords: they are barons in a threefold manner, viz. feudal, in regard to the temporalities annexed to their bishoprics; by writ, as being summoned by writ to parliament; and lastly, by patent and creation: accordingly they have the precedence of all other barons, and vote as barons and bishops; and claim all the privileges enjoyed by the temporal lords, excepting that they cannot be tried by their peers, because, in cases of blood, they themselves cannot pass upon the trial, for they are prohibited by the canons of the church (as already observed) to be judges of life and death. They have the title of *Lords and Right Reverend Fathers in God*. There are 24 bishops in England; besides that of Sodor and Man, who has no seat in the House of Peers. The bishops of London, Durham, and Winchester, take place from the other bishops, who are to rank after them according to their seniority of consecration.

BISHOP'S COURT, an ecclesiastical court, held in the cathedral of each diocese, the judge whereof is the bishop's chancellor, who judges by the civil and canon law; and if the diocese be large, he has his commissaries in remote parts, who hold what they call *consistory courts*, for matters limited to them by their commission.

BISHOP and his Clerks, some little islands and rocks on the coast of Pembrokehire near St David's in Wales, which are very dangerous to mariners.

BISHOP'S CASTLE, a town of Shropshire in England, seated near the river Clun. It is a corporation, sends two members to parliament, and its market is much frequented by the Welch. W. Long. 2. 55. N. Lat. 52. 30.

BISHOP'S-STORTFORD, a town of Hertfordshire in England, seated on the side of a hill, in E. Long. 0. 25. N. Lat. 51. 50. It has several good inns, but the streets are not paved. It has a large church, one Presbyterian, and one Quaker meeting. Here was formerly a castle called *Weymore castle*, wherein a garrison was kept, but no remains of it are now left.

BISHOPING, a term among horse-dealers, to denote the sophistications used to make an old horse appear young, a bad one good, &c.

BISHOPRIC, the district over which a bishop's jurisdiction extends, otherwise called a diocese †.

In England there are 24 bishoprics, besides that of Sodor and Man; in Scotland, none at all; in Ireland, eighteen.

BISIGNANO, a town of Italy, in the kingdom of Naples, and in the hither Calabria. It hath a strong fort, a bishop's see, and the title of a principality. It is seated on a mountain near the river Buccoona, in E. Long. 16. 40. N. Lat. 39. 37.

BISKET, a kind of bread prepared by the confectioners, of fine flour, eggs, and sugar, and rose or orange water; or of flour, eggs, and sugar, with aniseeds and citron-peel, baked again and again in the oven, in tin or paper moulds. There are divers sorts of biscuits; as seed-bisket, fruit-bisket, long-bisket, round-bisket, Naples-bisket, sponge-bisket, &c.

SEA-BISKET, is a sort of bread much dried by passing the oven twice, to make it keep for sea-service. For long voyages they bake it four times, and prepare it

Bismillah fix months before the embarkation. It will hold good a whole year.

Bifnagar.

To preserve sea-bisket from insects, Mr Hales advises to make the fumes of burning brimstone pass through the casks full of bread. Bisket may be likewise preserved a long time, by keeping it in casks well calked, and lined with tin.

The ancients had their bisket prepared after the like manner, and for the like use, as the moderns. The Greeks called it *αβλος βισκουρος*, *q. d.* bread put twice to the fire. The Romans gave it the name of *panis nauticus*, or *capta*. Pliny denominates it *vetus aut nauticus panis tusus atque iterum coctus*. By which it appears, that, after the first baking, they ground or pounded it down again for a second. In some middle-age writers, it is called *paximas*, *paximus*, and *panis paximatus*. Among the Romans, we also meet with a kind of land-bisket for the camp-service, called *bucellatum*, sometimes *expeditionalis annona*, which was baked much, both to make it lighter for carriage, and less liable to corrupt, the coction being continued till the bread was reduced one fourth of its former weight.

BISMILLAH, a solemn form used by the Mahometans at the beginning of all their books and other writings, signifying, *In the name of the most merciful God*.

BISMILLAH is also used among the Arabs as a word of invitation to eat. An Arab prince will frequently sit down to eat in the street before his own door, and call to all that pass, even beggars, in this word, who do not fail to come and sit down to eat with him; for the Arabs are great levellers, and set every body upon a footing with them.

BISMUTH, called also *tin-glasi*, a ponderous brittle semi-metal, resembling zinc and the regulus of antimony, but differing greatly from them in quality.—Bismuth is sometimes found native, in small compact masses, of a pale lead-colour on the outside, but a silvery white within. It is very common in Germany, and not unfrequently found in the tin-mines of Cornwall, though little known, or at least regarded, there *.

BISNAGAR, formerly a very large and powerful kingdom of Asia, comprehending the kingdoms of Kanara, Messour, Travankor, Madura, Marava, and Tanjour. It was called *Bisnagar* from its capital city, and took the name of *Narasinga* from one of its rajahs or kings. We know nothing certain concerning this kingdom before the year 1520, when Khrisna Rajah, king of Bifnagar, made war with Adel Khan king of Visapur, from whom he resolved to take the city of Rachol, situated in the island of Salsette near Goa, which he said had belonged to his ancestors. The king of Bifnagar's army consisted of 733,000 foot, 35,000 horse, 586 elephants with towers on their backs, each of which had four men in it; besides these were 12,000 water-carriers, and the army was followed by 20,000 common women. The city, however, resisted this formidable army for three months; at the end of which, Adel Khan came to its relief with an army of 120,000 foot, 18,000 horse, 150 elephants, and many heavy cannon. In the engagement the king of Bifnagar proved victorious, and almost entirely destroyed the army of Adel Khan, taking from him 4000 horses, 100 elephants, 400 cannon, &c. Soon after, he took the city by assault; but consented to restore the booty

taken in the former battle, provided Adel Khan consented to come and kiss his foot as the sovereign lord of Kanara. This base condition was accepted, but accidentally prevented from being put in execution. From this time we hear of nothing remarkable till the year 1558, when a Portuguese of the city of Meliapor or *St Thomas*, on the coast of Coromandel, persuaded Rama Rajah, then king of Bifnagar, to march against that place, telling him the plunder would be worth 2,000,000, and that the destruction of Meliapor would be of great service to the images in the Pagods which were thrown down by the Christians. The king set out accordingly with an army of 500,000 men; but the inhabitants, instead of preparing for their defence, sent him a present of 4000 ducats. This somewhat appeased him: however, he would not enter the city, but ordered the inhabitants of both sexes, with all their valuable effects, to be brought into his presence; which being done, he found that the value of their whole substance did not exceed 80,000 ducats. On this he ordered the informer to be thrown to the elephants, who tore him in pieces; after which he dismissed the citizens, and restored all their goods so punctually, that only a silver spoon happening to be missing, it was sought for, and returned to the owner. In 1565, the happy state of this kingdom excited the envy of the kings of Dekan; who, having raised an army of 500,000 foot and 50,000 horse, defeated and killed the king of Bifnagar, though at the head of an army almost twice as numerous, and took the royal city itself. They are said to have spent five months in plundering it, although the inhabitants had before carried off 1550 elephants loaded with money and jewels to the amount of upwards of 100,000,000 of gold; besides the royal chair for state days, whose price could not be estimated. The victors, however, found a diamond of the size of an ordinary egg, besides another of a size somewhat inferior, and several other jewels of immense value. Afterwards, however, they were forced to abandon the kingdom, as being too large for them to keep in their hands. From this time the kingdom of Bifnagar remained pretty much unmolested till about the year 1627, when it was subdued by Aurengzebe, second son to Shah Jehan, and hath ever since remained subject to the Great Mogul. In some places of this kingdom it is said the roads have great forests of bamboes on each side, which are so thick that it is impossible for a man to pass. These forests are full of monkeys; and what is singular, those on the one side seem to be enemies to those on the other; for if a basket of rice is set down on the road with a parcel of small sticks about it, the monkeys on each side will come out, and fall a-fighting with the sticks till one of the parties retreats. This, it is said, is often done by travellers for diversion. They catch the wild elephants here in pitfalls, and then tame them by means of others already tamed: the latter seldom fail of beating the wild ones into a good behaviour. The town of Bifnagar is situated in E. Long. 78. o. N. Lat. 13. 20.

BISNOW, or BISCHNOU, a sect of the Banians in the East Indies; they call their god Ram-ram, and give him a wife: They adorn his image with golden chains, necklaces of pearls, and all sorts of precious stones. They sing hymns in honour of their god, mixing their devotion with dances and the sound of drums, flagelets,

* See further, *Chemistry*, n^o 208, 447.

flagelets, brazen basons, and other instruments. This sect lives wholly upon herbs and pulse, butter and milk.

BISOMUM, or **DISOMUM**, in Roman antiquity, a tomb for two dead bodies, or the ashes of two. The ancients frequently buried two, three, or four bodies in the same sepulchre, disposed aside of each other; for it was held an impiety to lay one a-top of another. Hence the sepulchres of the primitive Christians had the words *bisomi*, *trisomi*, *quadrisomi*, &c. inscribed on them, to indicate the number of bodies deposited in them.

BISON, in zoology, the trivial name of a species of bos. See BOS.

BISQUET, or **BISKET**. See **BISKET**.

BISSAGOS, a cluster of islands on the coast of Negroeland in Africa, situated between the mouth of the river Gambia and Rio Grande. Their names are *Bulam*, *Cassuabac*, *La Gallinci*, *Cazegur*, *Galacha*, and *Oranguana*, with some other small islands; but the only one which merits a particular description is that of *Bulam* *. Each of these islands is governed by a king of its own; and as all those petty monarchs are quite independent, they frequently make war with each other, yet they always unite against the inhabitants of *Bialara*, who are their common enemies. They have canoes that carry from 25 to 40 men with their provisions and arms, which are sabres, and bows, and arrows. The inhabitants are negroes; who are tall, strong, and healthy, though they live only on fish, nuts, and palm-oil; choosing rather to sell the rice, mullet, and other grain produced in their country, to the Europeans, than not to gratify their passion for trinkets and ornaments. In general, they are idolaters; cruel and savage in their disposition, not only to strangers but to one another, when they happen to quarrel, as they frequently do about trifles; and if they happen to be disappointed of their revenge, they frequently drown or stab themselves.

BISSAO, an island on the coast of Africa, a few leagues to the south-east of the river Gambia, and separated from the continent only by the channel of the river Geves. In this island the French have a factory, and there is also a fort belonging to the Portuguese, at both of which a great trade is carried on. The island is about 35 or 40 miles in circumference, having an agreeable prospect to the sea, from which it rises by a gentle ascent on every side to an eminence in the centre of the island. There are however a great many hills inferior in height to that in the middle, and separated by beautiful and fertile valleys divided by little rivulets, which at the same time augment the richness and elegance of the scene. So rich is the soil of *Bissao*, that wheat and maize spring up to the size of Indian corn, or rather resemble a field covered over with reeds or bamboos. The cattle also are of an extraordinary size, and seem to keep pace with the extravagant growth of the corn. Milk and wine are in the greatest abundance; but the island affords neither hogs nor horses. The former are forbid by the natives to be imported; and something in the soil or climate renders it unfit for the increase of the latter, which never thrive here. The dress of the men of all ranks in *Bissao* is only a skin fixed to the girdle before and behind. The dress of the married women consists of a cotton petticoat; but virgins go entirely naked,

wearing only bracelets of different kinds on their arms and legs. If they are of high quality, their bodies are marked or painted with a variety of hideous forms of snakes and other figures, which, as their colour is jet-black, gives their skins somewhat the appearance of flowered taffin. Even the prince's royal herself, the eldest daughter of the emperor, is only distinguished from other women by the elegance of those paintings and the richness of her bracelets. One very extraordinary ornament used in this country is a large iron ring, with a flat round surface on the outside instead of a stone, upon which the ring changes with a bit of iron, in such a manner as to converse with the greatest facility by means of the different sounds produced; but this kind of language is used only among the polite and the great. All the *Bissao*ans are idolaters, nor has commerce introduced the smallest change in their manners, but their ideas of religion are exceedingly confused. Their chief idol is a little image called *China*, of which the worshippers give very absurd accounts; but besides this, every man invents a god for himself: trees are held sacred; and if not adored as gods, are worshipped as the residence of some divinity. The government is despotic, the will of the emperor being a law to his people. Of this we have an instance in *Bissao*, not to be matched in any other country whatever. This is no other than a present which one subject may make of the house and estate of his neighbour to the emperor; and as it is most commonly his majesty's pleasure to accept of such presents, the proprietor dares not resist, but immediately sets about building another house, though even this he cannot do without the prince's leave; and if this should not be readily granted, he must live with his family in the open air till permission to build a new house can be obtained.

BISSAT (Peter), professor of canon law in the university of Bononia in Italy, was descended from the earls of Fife in Scotland, and born in that county in the reign of James V. He was educated at St Andrews: from thence he removed to Paris; and, having spent some time in that university, proceeded to Bononia, where he commenced doctor of laws, and was afterwards appointed professor of canon law. He continued in that honourable employment several years with great reputation, and died in the year 1568. He is said to have been not only a learned civilian, but an excellent poet, orator, and philosopher. *Patricij-Bissarti opera omnia, viz. poemata, orationes, lectiones feriales, &c. Lib. de irregularitate, &c.* were published at Venice in 1565, 4to.

BISSENPOUR, a small district of the kingdom of Bengal, in the East Indies, which has all along preserved its independence *. It has been governed time immemorial by a Bramin family of the tribe of Rajahput. Here the purity and equity of the ancient political system of the Indians is found unadulterated. This singular government, the finest and most striking monument in the world, has till now been bled with too much indifference. We have no remains of ancient nations but brass and marble, which speak only to imagination and conjecture, those uncertain interpreters of manners and customs that no longer exist. Were a philosopher transported to *Bissenpou*r, he would immediately be a witness of the life led by the first inhabi-

Bisso
||
*Bissenpou*r.

Biffenpour
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Bift.

tants of India many thousand years ago; he would converse with them; he would trace the progress of this nation, celebrated as it were from its very infancy; he would see the rise of a government which, being founded in happy prejudices, in a simplicity and purity of manners, in the mild temper of the people, and the integrity of the chieftains, has survived those innumerable systems of legislation, which have made only a transitory appearance in the stage of the world with the generations they were designed to torment. More solid and durable than those political structures, which, raised by impetuosity and enthusiasm, are the scourges of human kind, and are doomed to perish with the foolish opinions that gave them birth, the government of Biffenpour, the offspring of a just attention to order and the laws of nature, has been established and maintained upon unchangeable principles, and has undergone no more alteration than those principles themselves. The singular situation of this country has preserved to the inhabitants their primitive happiness and the gentleness of their character, by securing them from the danger of being conquered, or of imbruing their hands in the blood of their fellow-creatures. Nature has surrounded them with water; and they need only open the sluices of their rivers to overflow the whole country. The armies sent to subdue them have so frequently been drowned, that the plan of enslaving them has been laid aside; and the projectors of it have thought proper to content themselves with an appearance of submission.

Liberty and property are sacred in Biffenpour. Robbery, either public or private, is never heard of. As soon as any stranger enters the territory, he comes under the protection of the laws, which provide for his security. He is furnished with guides at free cost, who conduct him from place to place, and are answerable for his person and effects. When he changes his conductors, the new ones deliver to those they relieve an attestation of their conduct, which is registered and afterwards sent to the Raja. All the time he remains in the country, he is maintained and conveyed with his merchandise at the expence of the state, unless he desires leave to stay longer than three days in the same place. In that case, he is obliged to defray his own expences; unless he is detained by any disorder, or other unavoidable accident. This beneficence to strangers is the consequence of the warmth with which the citizens enter into each others interests. They are so far from being guilty of an injury to each other, that whoever finds a purse, or other thing of value, hangs it upon the first tree he meets with, and informs the nearest guard, who give notice of it to the public by beat of drum. These maxims of probity are so generally received, that they direct even the operations of government. Out of about 350,000l. on an average it annually receives, without injury to agriculture or trade, what is not wanted to supply the unavoidable expences of the state, is laid out in improvements. The Raja is enabled to engage in these humane employments, as he pays the Moguls only what tribute and at what times he thinks proper.

BISSEXTILE, in chronology, a year consisting of 366 days, being the same with our leap-year *.

BISTI, in commerce, a small coin of Persia: Some say that it is among the current silver coins of Persia, and worth only a little above three farthings of our

money; others speak of it again as a money of account.

BISTONIS, (anc. geog.), a lake of Thrace near Abdera, on which dwelt the Bistonians: hence *Bistonius Tyrannus* is by Lucan used to denote Diomedes king of Thrace, who fed his horses with human flesh; and *Bistonius turbo*, a wind blowing from Thrace.

BISTORT, or **KNOTGRASS**, in botany, the trivial name of a species of polygonum. See **POLYGONUM**.

BISTOURY, in surgery, an instrument for making incisions; of which there are different kinds, some being of the form of a lancet, others straight and fixed in the handle like a knife, and others crooked with the sharp edge on the inside.

BISTRE, among painters, signifies the burnt oil extracted from the foot of wood.

It is of a brown transparent colour, having much the same effect in water-painting, where alone it is used, as brown pink in oil. Though this colour is extremely serviceable in water-colours, and much valued by those who know and can procure it; yet it is not in general use here, perhaps on account of its not being easily procured of a perfect kind; hardly any of it being good, except that imported from France. Perhaps the principal reason for this is, that dry beech-wood affords the best foot for making it: and it is not easy to procure such here without mixture of the foot of green wood, or other combustibles that deprave it for this purpose: or it is possible that they who have pretended to prepare it, have been ignorant of the proper means; there not being any recipe or directions in books that treat of these matters, from whence they could learn the proper process.

Bistre may, however, be prepared with great ease in the following manner.—Take any quantity of foot of dry wood, but let it be of beech wherever that can be procured. Put it into water in the proportion of two pounds to a gallon; and boil them half an hour: then after the fluid has stood some little time to settle, but while yet hot, pour off the clearer part from the earthy sediment at the bottom; and if on standing longer it forms another earthy sediment, repeat the same method, but this should be done only while the fluid remains hot: evaporate then the fluid to dryness; and what remains will be good bistre, if the foot was of a proper kind.—The goodness of bistre may be perceived by its warm deep brown colour, and transparency when moistened with water.

BISTRICZ, a handsome strong town of Transylvania, seated on a river of the same name, in E. Long. 25. 3. N. Lat. 47. 33.

BIT, or **BITT**, an essential part of a bridle. Its kinds are various. 1. The mufrol, snaffle, or watering-bit. 2. The canon-mouth, jointed in the middle. 3. The canon with a fast mouth, all of a piece, only kned in the middle, to form a liberty or space for the tongue; fit for horses too sensible, or ticklish, and liable to be continually bearing on the hand. 4. The canon-mouth, with the liberty in form of a pigeon's neck; proper where a horse has too large a tongue. 5. The canon with a port mouth, and an upset or mounting liberty; where a horse has a good mouth, but large tongue. 6. The scatch-mouth, with an upset; ruder but more secure than a canon mouth. 7. The canon mouth with a liberty; proper for a horse with a large tongue, and round bars. 8. The multi-

* See *Astronomy*,
NO 292.

masthead, or flaving bit, &c. The several parts of a snaffle, or curb-bit, are the mouth piece, the cheeks and eyes, guard of the cheek, head of the cheeks, the port, the welts, the campanel or curb and hooks, the bolsters, the bolsters and rabbits, the water-chains, the side-bolts, and rings, kirbles of the bit or curb, trench, top-rol, flap and jieve. The importation of bits for bridles is now prohibited.

BIT, or *Bitto*, in ship-building, the name of two great timbers, usually placed abast the manger, in the ship's loof, through which the cross-piece goes: The use of it is to belay the cable thereto, while the ship is at anchor.

BITBURG, a town of the Netherlands, in the duchy of Luxemburg. E. Long. 6. 43. N. Lat. 50. 0.

BITCH, the female of the dog kind. See *CANIS*.

BITCHE, a town of Lorrain, capital of a territory of the same name, and seated at the foot of the mountains near the river Swolbe. E. Long. 7. 44. N. Lat. 49. 5.

BITETO, a town of Italy, in the kingdom of Naples, and in the Terra di Bari. E. Long. 16. 56. N. Lat. 41. 8.

BITHYNIA, an ancient kingdom of Asia formerly known by the names of *Myfia*, *Mygdonia*, *Babrycia*, *Mariandynia*, and *Bitlynia*. It was bounded on the west by the Bosphorus Thracius and part of the Propontis, on the south by the river Rhynadus and mount Olympus, on the north by the Euxine sea, and on the east by the river Parthenius. The chief cities were *Myrlea*, *Nicomedia*, *Chalcedon*, *Heraclea*, and *Prusa*. See these articles. As to its history, we find nothing of moment recorded; except the infamous conduct of Prusias, one of its kings, in delivering up to the Romans Hannibal, the great Carthaginian general, who fled to him for protection. His great grandson Nicomedes IV. bequeathed the kingdom to the Romans. From them it was taken by the Turks, to whom it still remains subject, but has no modern name.

BITONTO, an episcopal town of Italy, in the kingdom of Naples and Terra di Bari. It is seated in a plain eight miles south of the gulph of Venice, in E. Long. 16. 52. N. Lat. 41. 13.

BITTACLE. See *BINACLE*.

BITTER, an epithet given to all bodies of an opposite taste to sweetness. For the medical virtues of bitters, see *MATERIA MEDICA*, n^o 51.

BITTER, a sea-term, signifying any turn of the cable about the bits, so as that the cable may be let out by little and little. And when a ship is stopped by a cable, she is said to be brought up by a bitter. Also that end of the cable which is wound about the bits is called the bitter end of the cable.

BITTER-Apple, in botany. See *COLOCYNTHIS*.

BITTER-Salt. See *EPSOM-Salt*.

BITTER-Sweet, in botany. See *SOLANUM*.

BITTERN, in ornithology. See *ARDEA*.

BITTERN, in the salt-works, the brine remaining after the salt is concreted: this they ladle off, that the salt may be taken out of the pan, and afterwards put in again; when, being farther boiled, it yields more salt. See *SALT*.

BITUMENS, in natural history, are oily matters, of a strong smell, and of different consistencies, which are found in many places within the earth *.

BITUMEN JUDAICUM. See *ASPHALTUM*.

BIVALVES, a term sometimes used for such shells as consist of two pieces.—It is also an appellation given by botanists to such pods, or capsules, as consist of two valves including the seeds.

BIVENTER, in anatomy, called also digastric, or two-bellied, a muscle of the lower jaw *.

BIUMBRES, in geography, an appellation given to the inhabitants of the torrid zone, by reason, at two different seasons of the year, their shadows are projected two different ways. The biumbres are the same with those otherwise denominated *amphiscii*.

BIXA, *ANNOITA*, or *Roucou*; a genus of the monogynia order, belonging to the polyandria class of plants. Of this genus there is but one species known, viz. the orellana, a native of the warm parts of America. This rises with an upright stem to the height of eight or ten feet, sending out many branches at the top forming a regular head, garnished with heart-shaped leaves ending in a point, and having long footstalks. The flowers are produced in loose panicles at the end of the branches: these are of a pale peach-colour, having large petals, and a great number of bristly stamina of the same colour in the centre. After the flower is past, the germen becomes a heart-shaped, or rather a mitre-shaped, vessel, covered on the outside with bristles opening with two valves, and filled with angular seeds. These seeds are covered with a red pulp or paste, from which the colour called *ANNOITA* is prepared, according to the process described under that article. This plant must be propagated by seeds procured from America. They are to be sown in pots in the spring, and plunged in a bed of tanners bark: the plants must afterwards be removed into separate pots, and always kept in the stove.

BIZARRO, in the Italian music, denotes a fanciful kind of composition, sometimes fast, slow, soft, strong, &c. according to the fancy of the composer.

BIZOCHI, or *BISOCHI*, in church-history, certain heretical monks, said to have assumed the religious habit contrary to the canons, rejected the sacraments, and maintained other errors.

BLACK, a well known colour, supposed to be owing to the absence of light, most of the rays falling upon black substances being not reflected but absorbed by them. Concerning the peculiar structure of such bodies as fits them for appearing of this or that particular colour, see the article *COLOUR*.

Concerning black colours in general, we have the following remarks by Dr Lewis.

“ 1. Of black, as of other colours, there are many shades or varieties; different bodies, truly and simply black, or which have no sensible admixture of any of the rest of the colours, as black velvet, fine black cloth, the feathers of the raven, &c. appearing, when placed together, of tints very different.

“ 2. One and the same body also assumes different degrees of blackness, according to the disposition of the sensible parts of its surface; and in this respect, there is not, perhaps, any other colour, which is so much affected by an apparent mechanism. Thus black velvet, when the pile is raised, appears intensely black, much more so than the silk it was made from; but on pressing the pile smooth, it looks pale, and in certain positions shews somewhat even of a whitish cast.

“ 3. This

Bitumen.

Blacks.

* See *Anatomy*, Table of the Muscles.

" 3. This observation is agreeable to the physical theory, which ascribes the blackness of bodies to the luminous rays, that fall upon them, being in great part absorbed or stifled in their pores. When the surface is composed of a multitude of loose filaments, or small points, with the extremities turned towards the eye, much of the light is stifled in the interstices between them, and the body appears dark : when the filaments are pressed close, or the surface smoothed and polished, more of the light is reflected from it, and the intensity of the blackness is diminished; though the beauty may be improved by the glossiness which results from the smoothing.

" 4. There is one case, however, in which a high polish may, on the same principle, produce blackness, in bodies otherwise even white. We find that specula of white metal, or of quicksilvered glass, which reflect the rays of light to one point or in one direction, look always dark, unless when the eye is directly opposed to the reflected rays.

" 5. As the absorption of the luminous rays, except in the case just mentioned, makes the physical cause of blackness; it is concluded that black bodies receive heat more freely than others. Black marble or tiles, exposed to the sun, become sensibly hotter than white ones. Black paper is kindled by a burning glass much sooner than white, and the difference is strongly marked: a burning-glass, too weak to have any visible effect at all upon white paper, shall readily kindle the same paper rubbed over with ink. Hence black clothes, when wetted, are said to dry faster; black habits, and rooms hung with black, to be warmer; black mould to be a hotter soil for vegetables; and garden walls, painted black, to answer better for the ripening of wall fruit than those of lighter colours.

" 6. It is not, however, to be affirmed that the like differences obtain in the impressions made by common fire. Black paper, held to the fire, does not seem to be affected sooner, or in a greater degree, than such as is white. It may be proper to observe also, that the combustibility of the paper may be increased, by impregnating it with substances of themselves not combustible, and which give no colour to it. This is the foundation of one of the *sympathetic inks*, as they are called, made of a strong solution of sal ammoniac in water, which, though colourless when written with on paper, becomes very legible on exposing the paper to the fire; that is, it occasions the parts moistened with it to scorch or burn, before the rest of the paper is hurt, to a brown or black. All the salts I have tried produced this effect in a greater or less degree; nitre, alum, tartar, very weakly; sea-salt more strongly; fixed alkaline salts still more so; sal ammoniac the most strongly of all. Metallic solutions, made in acids, and diluted so as not to corrode the paper, acted in the same manner.

" 7. Besides the simple blacks, there are a multitude of compound ones, inclining more or less to other colours. Thus the painters have blue-blacks, brown-blacks, &c. which may be made by mixing pigments of the respective colours with simple black ones, in greater or less quantity, according to the shade required. The dyers also have different blacks, and often darken other colours by slightly passing them through the black dying liquor; but the term *brown-black* is in

this business unknown, brown and black being here looked upon as opposite to one another. In effect, the colour called *brown-black* is no other than that which ill-dyed black clothes change to in wearing: no wonder then that it is excluded from the catalogue of the dyers colours.

" 8. The true or simple blacks, mixed with white, form different shades of grey, lighter or darker according as the white or black ingredients prevails in the mixt. The black pigments, spread thin upon a white ground, have a like effect.

" 9. Hence the painter, with one true black pigment, can produce on white paper, or on other white bodies, all the shades of grey and black, from the slightest discoloration of the paper, up to a full black: and the dyer produces the same effect on white wool, silk, or cloth, by continuing the subjects for a shorter or longer time in the black bath, or making the bath itself weaker or stronger.

" 10. Hence also the dilution of black pigments with white, or the spreading of them thin upon a white ground, affords a ready method of judging of the quality or species of the colour; which, if it be a true black, will in this diluted state look of a pure or simple grey; but if it has a tendency to any other colour, that colour will now betray itself.

" 11. All the colours, in a very deep or concentrated state, approach to blackness. Thus the red liquor prepared by boiling or infusing madder-root in water, and the yellow decoction or infusion of liquorice-root, evaporated in a gentle heat till they become thick, look of a dark black colour, or of a colour approaching to blackness; and these thick masses, drawn out into slender strings, or diluted with water, or rubbed on paper, exhibit again the red and yellow colours, which the liquors had at first. Nature affords many black objects, whose blackness depends upon the same principle, being truly a concentration of some of the other colours. Thus in black-berries, currants, elderberries, &c. what seems to be black is no other than an opaque deep red: their juice appears black when its surface is looked down upon in an opaque vessel, but red when diluted or spread thin. The black flint, as it is called, of the island of Ascension, held in thin pieces between the eye and the light, appears greenish; and one of the deep black stones called *black agate*, viewed in the same manner, discovers its true colour to be a deep red."

The most remarkable black colours in the mineral kingdom are, *Black CHALK*, *PITCOAL*, *Black SANDS*, and *Black LEAD*; (see these articles).—The only native vegetable black is the juice of the anacardium orientale, which possibly may be the tree that produces the excellent black varnish of China and Japan; (see *VARNISH*).—The juices of most affrugi vegetables produce a black with iron, and for this purpose some of them are used in dyeing and callico-printing; (see the article *DYEING*).—There are also a number of black colours artificially prepared for the use of painters, such as lamp-black, ivory-black, German-black, &c. for an account of the preparation and qualities of which, see the article *COLOUR-MAKING*.

Black-Bird, in ornithology. See *TURDUS*.

Black-Book of the Exchequer. See *EXCHEQUER*.

Black-Books, a name given to those which treat of necromancy, or, as some call it, *nigromancy*. The black-

black-book of the English monasteries was a detail of the scandalous enormities practised in religious houses, compiled by order of the visitors under King Henry VIII. to blacken, and thus hasten their dissolution.

BLACK-Caps, in ornithology. See **MOTACILLA**.

BLACK-Cock. See **TETRAO**.

BLACK-Eagle. See **FALCO**.

BLACK-Fanuchs, in the customs of eastern nations, are Ethiopians castrated, to whom their princes commonly commit the care of their women.

BLACK-Forest, a forest of Germany, in Suabia, running from north to south between Ortnau, Brisgaw, part of the duchy of Wirtemberg, the principality of Fultemburg towards the source of the Danube, as far as the Rhine above Basil. It is part of the ancient Hyrcanian forest.

BLACK-Friers, a name given to the dominican order; called also *predicants* and *preaching fryers*; in France, *jacobins*.

BLACK-Lead. See **LEAD**.

BLACK-Leather is that which has passed the curriers hands, where, from the russet as it was left by the tanners, it is become black, by having been scored and rubbed three times on the grain-side with copperas-water.

BLACK-Mail, a link of mail, or small pieces of metal or money. In the counties of Northumberland, Cumberland, Westmoreland, and several parts of Scotland, it was formerly taken for a certain rent of money, corn, cattle, or other consideration, paid by poor people near the borders, to persons of note and power, allied with some moss-troopers, or known robbers, in order to protect them from pillage.

BLACK-Rod. See **ROD**.

BLACK-Sea. See **EUXINE SEA**.

BLACK-Water, the name of two rivers in Ireland; one of which runs through the counties of Cork and Waterford, and falls in Youghal bay; and the other, after watering the county of Armagh, falls into Lough-Neah.

BLACKBANK, a town of Ireland, in the county of Armagh and province of Ulster, seated in W. Long. 6. 55. N. Lat. 54. 12.

BLACKBERRY, in botany. See **RUBUS**.

BLACKBURN, a town of Lancashire in England, seated near the river Derwent. It takes its name from the brook Blackwater which runs thro' it. W. Long. 2. 15. N. Lat. 53. 40.

BLACKALL (Dr Ollspring), bishop of Exeter in the beginning of the 18th century, was born at London 1654, and educated at Catherine-Hall, Cambridge. For two years he refused to take the oath of allegiance to king William and queen Mary, but at last submitted to the government, though he seemed to condemn the Revolution, and all that had been done pursuant to it. He was a man of great piety, had much primitive simplicity and integrity, and a constant evenness of mind. In a sermon before the House of Commons, Jan. 30th, 1699, he animadverted on Toland's assertion in his *Life of Milton*, that Charles I. was not the writer of the *Icon Basilike*, and for some insinuations against the authenticity of the Holy Scriptures; which produced a controversy between him and that author. In 1700, he preached a course of sermons in St Paul's at Boyle's lecture, which were af-

terwards published; and was consecrated bishop of Exeter in 1707. He died at Exeter in 1716, and was interred in the cathedral there.

BLACKMORE (Sir Richard), a physician, and voluminous writer, of theological, poetical, and physical works. Having declared himself early in favour of the Revolution, king William, in 1697, chose him one of his physicians in ordinary, and conferred the honour of knighthood on him. On queen Anne's accession, Sir Richard was also appointed one of her physicians, and continued so for some time. Dryden and Pope treated the poetical performances of Blackmore with great contempt; and in a note to the mention made of him in the Dunciad, we are informed that his "indefatigable muse produced no less than six epic poems: *Prince and King Arthur*, 20 books; *Elixa*, 10; *Alfred*, 12; *The Redeemer*, six; beside *Job*, in folio; the whole book of *Psalms*; *The Creation*, seven books; *Nature of Man*, three books; and many more." But notwithstanding Blackmore was much ridiculed by the wits, he is not without merit: and Addison has, in the *Spectator*, bestowed some liberal commendations on his poem on the Creation. It must be mentioned too in honour of Sir Richard, that he was a chaste writer, and a warm advocate for virtue, at a time when an almost universal degeneracy prevailed. He had been very free in his censures on the libertine writers of his age; and it was owing to some liberty he had taken of this kind, that he drew upon him the resentment of Mr Dryden. He had likewise given offence to Mr Pope; for having been informed by Mr Curl that he was the author of a travestie on the first Psalm, he took occasion to reprehend him for it in his essay on polite learning. Besides what are above mentioned, Sir Richard wrote some theological tracts, and several treatises on the plague, small pox, consumptions, the spleen, gout, dropsy, &c. and many other poetical pieces. He died October 9. 1729.

BLACKS, in physiology. See **NEGROES**.

BLADDER (Urinary), in anatomy. See **ANATOMY**, n° 364.—See also **COMPARATIVE ANATOMY**, n° 26, 28, 95, 122, 149.

Air-Bladder. See **COMPARATIVE ANATOMY**, n° 147.

Gall-Bladder. See **ANATOMY**, n° 358.

Bladder-Nut. See **STAPHYLÆA**.

Bladder-Senna. See **COLUTÆA**.

BLADEN (Martin), a translator and dramatic author, was formerly an officer in the army, bearing the commission of a lieutenant-colonel in queen Anne's reign, under the great duke of Marlborough, to whom he dedicated a translation of Caesar's Commentaries, which he had completed, and which is to this day a book held in good estimation. In 1714, he was made one of the Lords Commissioners of Trade and Plantations; and in 1717 was appointed envoy extraordinary to the court of Spain, in the room of — Brett. Esq; but declined it, chusing rather to keep the post he already had, which was worth L. 1000 *per annum*, and which he never parted with till his death, which was in May 1746. He was also many years member of parliament for the town of Portsmouth. He wrote two dramatic pieces; both of which (for the one is only a masque introduced in the third act of the other) were printed in the year 1705, without the author's consent.

Thier

Blair.

Their names are, 1. Orpheus and Euridice, a Masque.
2. Solon, a Tragic Comedy.

BLAEU (William), a famous printer of Amsterdam, a disciple and friend of Tycho Brahe's: his Atlas, his Treatise of the Globes, Astronomical Institutions, &c. and his fine impressions, have secured his memory. He died in 1638.

BLAFART, in commerce, a small coin, current at Cologne, worth something more than a farthing of our money.

BLAGRAVE (John), the second son of John Blagrave, of Bulmarsh-court near Sunning in Berkshire, descended of an ancient family in that country. From a grammar-school at Reading he was sent to St John's college in Oxford, where he applied himself chiefly to the study of mathematics, and, without taking any degree, afterwards retired to his patrimonial seat of Southcole-lodge near Reading, where he spent the remainder of his life. In this mansion he died in the year 1611; and was buried in the church of St Lawrence, where a sumptuous monument was erected to his memory. Having never married, he bequeathed to all the posterity of his three brothers, the sum of 50*l.* each payable at the age of 26; and he calculated his donation so well, that near fourscore of his nephews and their descendants have reaped the benefit of it. He also settled certain lands at Swallowfield in the same county, as a provision for the poor for ever. Among other charities, he left ten pounds to be annually disposed of in the following manner: On Good-Friday, the church-wardens of each of the three parishes of Reading send to the town-hall one virtuous maid, who has lived five years with her master: there, in the presence of the magistrates, these three virtuous maids throw dice for the ten pounds. The two losers are returned with a fresh one the year following, and again the third year, till each has had three chances. He is said to have been not more remarkable for his mathematical knowledge, than for his candour and generosity to his acquaintance. His works are, 1. *A mathematical jewel.* Lond. 1585, fol. 2. *Of the making and use of the familiar staff.* Lond. 1590, 4to. 3. *Astrolabium uranicum generale.* Lond. 1596, 4to. 4. *The art of dialing.* Lond. 1609, 4to.

BLAIN, among farriers, a distemper incident to beasts, being a certain bladder growing on the root of the tongue, against the wind-pipe, which swells to such a pitch as to stop the breath. It comes by great chaffing and heating of the stomach, and is perceived by the beast's gaping and holding out his tongue, and foaming at the mouth. To cure it, caulk the beast, take forth his tongue, and then, sitting the bladder, wash it gently with vinegar and a little salt.

BLAIR (John), a Scottish author, was cotemporary with, and the companion, some say the chaplain, of Sir William Wallace. He attended that great hero in almost all his exploits; and, after his death, which left so great a stain on the character of Edward I. of England, he wrote his memoirs in Latin. The injury of time has destroyed this work, which might have thrown the greatest light on the history of a very busy and remarkable period. An inaccurate fragment of it only has descended to us, from which little can be learned, and which was published, with a commentary, by Sir Robert Sibbald.

BLAIR (James), an eminent divine, was born and bred in Scotland, where he had at length a benefice in the episcopal church; but meeting with some discouragements, he came to England, in the latter end of the reign of king Charles II. and was sent by Dr Compton as a missionary to Virginia, and was afterwards, by the same bishop, made commissary for that colony, the highest office in the church there. He distinguished himself by his exemplary conduct and unwearied labours in the work of the ministry; and finding that the want of proper seminaries for the advancement of religion and learning was a great damp upon all attempts for the propagation of the gospel, he formed a design of erecting and endowing a college at Williamsburgh, in Virginia, for professors and students in academical learning. He therefore not only set on foot a voluntary subscription; but, in 1693, came to England to solicit the affair at court: when queen Mary was so well pleased with the noble design, that she espoused it with particular zeal; and king William readily concurring with her majesty, a patent was passed for erecting and endowing a college by the name of the *William and Mary college*, of which Mr Blair was appointed president, and enjoyed that office near 50 years. He was also rector of Williamsburgh, and president of the council in that colony. He wrote, *Our Saviour's divine Sermon on the Mount* explained in several sermons, 4 vols. octavo; and died in 1743.

BLAIR of Athol, a castle belonging to the duke of Athol, seated in the county of Athol in Scotland, 28 miles north-west of Perth. W. Long. 3. 30. N. Lat. 56. 46.

BLAISOIS, a province of France, bounded on the north by Beauce, on the east by the Orleannois, on the south by Berry, and on the west by Touraine. Blois is the capital town.

BLAKE (Robert), a famous English admiral, born August 1589, at Bridgwater, in Somersetshire, where he was educated at the grammar-school. He went from thence to Oxford in 1615, where he was entered at St Alban's hall. From thence he removed to Wadham college; and on the 10th of February 1617, he took the degree of bachelor of arts. In 1623, he wrote a copy of verses on the death of Mr Camden, and soon after left the university. He was tainted pretty early with republican principles; and disliking that severity with which Dr Laud, then bishop of Bath and Wells, pressed uniformity in his diocese, he began to fall into the puritanical opinions. His natural bluntness causing his principles to be well known, the puritan party returned him member for Bridgwater in 1640; and he served in the parliament army with great courage during the civil war: but when the king was brought to trial, he highly disapproved the measure as illegal, and was frequently heard to say, *he would as freely venture his life to save the king, as ever he did to serve the parliament.* But this is thought to have been chiefly owing to the humanity of his temper, since after the death of the king he fell in wholly with the republican party, and, next to Cromwell, was the ablest officer the parliament had.

In 1648-9, he was appointed, in conjunction with colonel Deane and colonel Popham, to command the fleet; and soon after blocked up prince Maurice and prince Rupert in Kinsale harbour. But these getting out, Blake

Blake followed them from port to port: and at last attacked them in that of Malaga, burnt and destroyed his whole fleet, two ships only excepted, the Reformation in which prince Rupert himself was, and the Swallow commanded by his brother prince Maurice. In 1652, he was constituted sole admiral; when he defeated the Dutch fleet commanded by Van Trump, Ruyter, and De Wit, in three several engagements, in which the Dutch lost 11 men of war, 30 merchant-ships, and, according to their own accounts, had 15,000 men slain. Soon after, Blake and his colleagues, with a grand fleet of 100 sail, stood over to the Dutch coast; and forced their fleet to fly for shelter into the Texel, where they were kept for some time by Monk and Dean, while Blake sailed northward. At last, however, Trump got out, and drew together a fleet of 120 men of war; and, on the 3^d of June, the generals Dean and Monk came to an engagement with the enemy off the North Foreland, with indifferent success: but the next day Blake coming to their assistance with 18 ships, gained a complete victory; so that if the Dutch had not saved themselves on Calais sands, their whole fleet had been sunk or taken.

In April 1653, Cromwell turned out the parliament, and shortly after assumed the supreme power. The states hoped great advantages from this; but were disappointed. Blake said on this occasion to his officers, "It is not for us to mind state-affairs, but to keep foreigners from fooling us."—In November, 1654, Cromwell sent him with a strong fleet into the Mediterranean, with orders to support the honour of the English flag, and to procure satisfaction for the injuries that might have been done to our merchants. In the beginning of December, Blake came into the road of Cadiz, where he was treated with all imaginable respect: a Dutch admiral would not hoist his flag while he was there; and his name was now grown so formidable, that a French squadron having stopped one of his tenders, which had been separated from Blake in a storm, the admiral, as soon as he knew to whom it belonged, sent for the captain on board, and drank Blake's health before him with great ceremony, under a discharge of five guns, and then dismissed him. The Algerines were so much afraid of him, that, stopping the Saltee rovers, they obliged them to deliver up what English prisoners they had on board, and then sent them freely to Blake, in order to purchase his favour. This, however, did not prevent his coming on the 10th of March before Algiers, and sending an officer on shore to the dey to demand satisfaction for the piracies committed on the English, and the release of all the English captives. The dey, in his answer, alleged, that the ships and captives belonged to private men, and therefore he could not restore them without offending all his subjects, but that he might easily redeem them; and if he thought good, they would conclude a peace with him, and for the future offer no acts of hostility to the English: and having accompanied this answer with a large present of fresh provisions, Blake left Algiers, and sailed on the same errand to Tunis; the dey of which place not only refused to comply with his request, but denied him the liberty of taking in fresh water. "Here," said he, "are our castles of Goletto and Porto Ferino; do your worst." Blake, at hearing this, began, as his custom was when highly provoked, to curl his whiskers; and,

after a short consultation with his officers, bore into the bay of Porto Ferino with his great ships and their second; and, coming within musquet-shot of the castle and the line, fired on both so warmly, that in two hours time the castle was rendered defenceless, and the guns on the works along the shore were dismounted, though 60 of them played at a time on the English. Blake found nine ships in the road, and ordered every captain to man his long-boat with choice men, to enter the harbour and fire the Tunisians; which they happily effected, with the loss of 25 men killed, and 48 wounded, while he and his men covered them from the castle by playing continually on them with their great guns. This daring action spread the terror of his name thro' Africa and Asia. From Tunis he sailed to Tripoli, caused the English slaves to be set at liberty, and concluded a peace with that government. Thence returning to Tunis, the Tunisians implored his mercy, and begged him to grant them peace, which he did upon terms highly advantageous to England. He next sailed to Malta, and obliged the knights to restore the effects taken by their privateers from the English; and by these great exploits, so raised the glory of the English name, that most of the princes and states in Italy thought fit to pay their compliments to the protector, by sending solemn embassies to him.

He passed the next winter either in lying before Cadiz, or in cruising up and down the Straights; and was at his old station, at the mouth of that harbour, when he received information that the Spanish plate fleet had put into the bay of Sancta Cruz, in the island of Teneriffe: upon this he weighed anchor, with 25 men of war, on the 13th of April 1657; and, on the 20th, rode with his ships off the bay of Sancta Cruz, where he saw 16 Spanish ships lying in the form of a half-moon. Near the mouth of the haven stood a castle, furnished with great ordnance; besides which there were seven forts round the bay, with six, four, and three guns on each, joined to each other by a line of communication manned with musqueteers. To make all safe, Don Diego Diagues, general of the Spanish fleet, caused all the smaller ships to be moored close along the shore; and the six large galleons stood farther out at anchor, with their broadsides towards the sea. Blake having prepared for the fight, a squadron of ships was drawn out to make the first onset, commanded by captain Stayner in the Speaker frigate: who no sooner received orders, than he sailed into the bay, and fell upon the Spanish fleet, without the least regard to the forts, which spent their shot prodigally upon them. No sooner were these entered into the bay, but Blake, following after, placed several ships to pour broadsides into the castle and forts; and these played their part so well, that, after some time, the Spaniards found their forts too hot to be held. In the mean time, Blake struck in with Stayner, and bravely fought the Spanish ships, out of which the enemy were beaten by two o'clock in the afternoon; when Blake, finding it impossible to carry them away, ordered his men to set them on fire; which was done so effectually, that they were all reduced to ashes, except two, which sunk downright, nothing remaining above the water but part of the masts. The English having now obtained a complete victory, were reduced to another difficulty by the wind, which blew so strong into the bay, that they despaired of getting out. They

Blake
Blanchard.

lay under the fire of the castles and of all the forts, which must in a little time have torn them to pieces. But the wind suddenly shifting, carried them out of the bay; where they left the Spaniards in astonishment at the happy temerity of their audacious victors. This is allowed to have been one of the most remarkable actions that ever happened at sea. "It was so miraculous (says the earl of Clarendon), that all men who knew the place, wondered that any sober man, with what courage soever endued, would ever have undertaken it; and they could hardly persuade themselves to believe what they had done; whilst the Spaniards comforted themselves with the belief, that they were devils and not men, who had destroyed them in such a manner." This was the last and greatest action of the gallant Blake. He was consumed with a dropsy and scurvy; and hastened home, that he might yield up his last breath in his native country, which he had so much adorned by his valour. As he came within sight of land, he expired.—Never man, so zealous for a faction, was so much respected and esteemed even by the opposite factions. Disinterested, generous, liberal; ambitious only of true glory, dreadful only to his avowed enemies; he forms one of the most perfect characters of that age, and the least stained with those errors and violences which were then so predominant. The protector ordered him a pompous funeral at the public charge: but the tears of his countrymen were the most honourable panegyric on his memory. The lord Clarendon observes, "that he was the first man who brought ships to condemn castles on shore, which had ever been thought very formidable, and were discovered by him to make a noise only, and to fright those who could be rarely hurt by them. He was the first that infused that degree of courage into seamen, by making them see by experience what mighty things they could do, if they were resolved; and the first that taught them to fight in fire as well as in water."

BLAMONT, a town of Lorraine in France, seated on a little river called *Vesouze*. E. Long. 6. 51. N. Lat. 48. 35.

BLANC. See BLANK.

BLANC, a town of Berry in France, seated on the river Creuse, by which it is divided into two parts. The land about it is barren, and full of trees, heath, and lakes. E. Long. 1. 13. N. Lat. 46. 38.

BLANCH-HOLDING, in law, a tenure, by which the vassal is only bound to pay an elusory yearly duty to his superior merely as an acknowledgment of his right*.

* See Law,
Part III.
no clxv. 3.

BLANCHARD (James), an excellent painter, was born at Paris, and learnt the rudiments of his profession under Nicholas Bollerius his uncle; but left him at 20 years of age, and travelled into Italy. He staid two years at Rome, and from thence went to Venice, where he was so charmed with the works of Titian, Tintoret, and Paul Veronese, that he resolved to follow their manner; and in this he succeeded so far, that at his return to Paris, he soon became generally esteemed for the novelty, beauty, and force of his pencil. He painted two galleries at Paris, one belonging to Perault, the first president, and the other to Bullion, superintendent of the finances; but his capital piece is a picture of the descent of the Holy Ghost in the church of Notre Dame. He was seized, in the flower of his age, with a fever and imposthume in the lungs, of which he died

in 1683. Of all the French painters Blanchard was esteemed the best colourist, he having carefully studied this part of painting in the Venetian school.

Carte-BLANCHE. See CARTE.

BLANCHING, the art or manner of making any thing white. See BLEACHING.

BLANCHING of *Iron-plates*, is performed with aquafortis and tin.

BLANCHING of *Woollen Stuffs*, is done with soap, or with chalk, or with sulphur or brimstone.

BLANCHING of *Silk*, is performed with soap and brimstone.

BLANCHING of *Wax*, is by exposing it to the sun and dew. See WAX.

BLANCHING of *Copper*. See CHEMISTRY, n° 381.

BLANCHING, in coinage, the operation performed on the planchets or pieces of silver, to give them the requisite lustre and brightness. They also blanch pieces of plate, when they would have them continue white, or have only some parts of them burnished.—Blanching, as it is now practised, is performed by heating the pieces on a kind of peel with a wood fire, in the manner of a reverberatory; so that the flame passes over the peel. The pieces being sufficiently heated and cooled again, are put successively to boil in two pans, which are of copper: in these they put water, common salt, and tartar of Montpellier. When they have been well drained of this water in a copper sieve, they throw sand and fresh water over them; and when dry, they are well rubbed with towels.

BLANCHING, among gardeners, an operation whereby certain sallots, roots, &c. are rendered whiter than they would otherwise be.—It is thus: After pruning off the tops and roots of the plants to be blanched, they plant them in trenches about ten inches wide, and as many deep, more or less, as is judged necessary; as they grow up, care is taken to cover them with earth, within four or five inches of their tops: this is repeated from time to time, for five or six weeks; in which time they will be fit for use, and of a whitish colour where covered by the earth.

BLANCHING also denotes the operation of covering iron plates with a thin coat or crust of tin.

BLANCO, a cape or promontory of Africa, in the Atlantic Ocean. W. Long. 18. 30. N. Lat. 20. 0.

BLANCO, a promontory of Peru in South America, in the South Sea. W. Long. 81. 10. N. Lat. 11. 50.

BLANDA, (anc. geog.), a Roman city in the territory of Barcin in Hispania Citerior; now *Blanes*, a sea-port town of Catalonia, situated near the river Tordara. E. Long. 3. 40. N. Lat. 41. 30.

BLANDFORD, a town of Dorsetshire in England. It is pleasantly seated on the river Stour near the Downs, but has been subject to several dreadful fires, particularly in 1731, when almost the whole town was burnt down; but it has since been rebuilt finer than before. It has the title of a marquissate, and lies in W. Long. 2. 15. N. Lat. 50. 50.

BLANDONONA, (anc. geog.), a small city of Liguria in Italy; now *Bron*, or *Broni*. See that article.

BLANES. See BLANDA.

BLANK, or BLANC, properly signifies white*.

BLANK, in commerce, a void or unwritten place which merchants sometimes leave in their day-books or journals.

BLANK-

BLANK-Verse, in the modern poetry, that composed of a certain number of syllables, without the assistance of rhyme. See **POETRY**.

Point-BLANK. See **POINT-Blank**.

BLANKENBERG, a town of Germany, in the circle of Westphalia and duchy of Berg. E. Long. 7. 18. N. Lat. 50. 54.

BLANKENBURG, a town of Germany, in the circle of Lower Saxony, and capital of the county of the same name, subject to the duke of Brunswick-Wolfenbuttle. The castle or palace is a modern building, and is the residence of the prince's dowager. E. Long. 11. 20. N. Lat. 51. 50.

BLANKENHEIM, a small territory of Germany with the title of a county, which is part of that of Eysler, near the archbishopric of Cologne and duchy of Juliers.

BLANKET, a coverlet for a bed. A stuff commonly made of white wool, and wrought in a loom like cloth; with this difference, that they are crossed like ferges.

When they come from the loom, they are sent to the fuller; and after they have been fulled and well cleaned, they are napped with a fuller's thistle.

There are blankets made with the hair of several animals; as that of dogs, goats, and others.

BLANQUILLE, in commerce, a small silver coin current in the kingdom of Morocco, and all that part of the coast of Barbary; it is worth about three-halves of our money.

BLARE, in commerce, a small copper coin of Bern, nearly of the same value with the ratz.

BLAREGNIES, a town of the Austrian Netherlands, in the province of Hainault, seated in E. Long. 3. 35. N. Lat. 50. 30. Near this place the English and their allies under the duke of Marlborough obtained a very bloody victory over the French in 1709. This is most commonly called the *battle of Malplaquet* *.

BLASE, bishop of Sebasta in Cappadocia, in the second and third centuries, suffered death under Dioclesian by decapitation, after being whipped and having his flesh torn with iron combs. He is a person of great note among the vulgar, who in their processions relative to the woollen trade, always carry a representation of him as the inventor or patron of the art of wool-combing; though that art must have been known long before his time. It is difficult to say how the invention came to be attributed to him; but it had probably no better origin than the circumstance of his being tortured by instruments used in combing of wool.

BLASIA, **LEATHER-CUP**, a genus of the order of algae, belonging to the cryptogamia class of plants. Of this genus there is but one species known, which grows naturally on the banks of ditches and rivulets, in a gravelly or sandy soil, both in England and Scotland. It grows flat upon the ground in a circle or patch, composed of numerous thin, green, pellucid, leaves, marked with a few whitish veins near the base, divided and subdivided into obtuse segments obscurely crenated on the edges. The margins of the leaves are a little elevated, but the interior parts adhere close to the ground by a fine down which answers the purpose of roots. The seeds are so small as to be almost imperceptible.

BLASPHEMY, an indignity or injury offered to **Blasphemy** the Almighty, by denying what is his due and of right belonging to him; or by attributing to the creature that which is due only to the Creator. **Blasph.**

The primitive church distinguished blasphemy into three sorts. 1. The blaspheming of apostates, whom the heathen persecutors obliged not only to deny, but to curse, Christ. These blasphemers were punished with the highest degree of ecclesiastical censure. 2. The blasphemy of heretics, and other profane Christians. In this sense, they included not only those who maintained impious doctrines, but those who uttered profane or blasphemous words, derogatory to the majesty and honour of God. The same punishment that was inflicted upon heretics and sacrilegious persons, was consequently the lot of this sort of blasphemers. 3. The blasphemy against the Holy Ghost, concerning which the opinions of the ancients varied. Some apply it to the sin of lapsing into idolatry and apostasy, and denying Christ in time of persecution. Others made it to consist in denying Christ to be God: others, in denying the divinity of the Holy Ghost; and others place it in a perverse and malicious ascribing the operations of the Holy Spirit to the power of the devil, and that against express knowledge and conviction of conscience.

Blasphemy, among the Jews, was punished by stoning the offender to death. In England, it is punishable at common law, by fine and pillory. And by a statute of William III. if any person shall, by writing or speaking, deny any of the persons in the Trinity, he shall be incapable of any office; and for the second offence, be disabled to sue in any actions, to be an executor, &c. According to the law of Scotland, the punishment of blasphemy is death *.

BLAST, in a general sense, denotes any violent explosion of air, whether occasioned by gun-powder, or by the action of a pair of bellows. * See Law, Part III. n^o cxxxvi.

BLASTS, among miners, the same with *damps* *.

BLAST, or **BLIGHT**, in husbandry. See **BLIGHT**.

BLASTING, a term used by miners for the tearing up rocks which lie in their way, by the force of gun-powder.

BLATTA, or **COCKROACH**, a genus of insects belonging to the order of hemiptera, or such as have four femicrustaceous incumbent wings. The head of the blatta is inflected towards the breast; the antennæ, or feelers, are hard like bristles; the elytra and wings are plain, and resemble parchment; the breast is smooth, roundish, and is terminated by an edge or margin; the feet are fitted for running; and there are two small horns above the tail. This insect resembles the beetle; and there are 10 species, viz. 1. The gigantea is of livid colour, and has square brownish marks on the breast. It is found in Asia and America, and is about the size of a hen's egg. 2. The alba is red, and the margin of the breast is white. It is found in Egypt. 3. The surinamensis is livid, and the breast edged with white. It is a native of Surinam. 4. The americana is of an iron colour, and the hind part of the breast is white. The wings and elytra are longer than its body. It is found in America and the south of France. 5. The pivea is white, with yellow feelers. It is a native of America. 6. The africana is ash-coloured, and has some hairs on its breast. It is found

in Africa. 7. The *orientalis* is of a dusky ash colour, has short elytra, with an oblong furrow in them. This species is frequent in America. They get into chests, &c. and do much hurt to cloaths; they infest peoples beds in the night, bite like bugs, and leave a very unfavourable smell behind them. They avoid the light, and seldom appear but in the night time. The female resembles a kind of caterpillar, as it has no wings; she lays an egg of about one half the bulk of her belly. They eat bread, raw or dressed meat, linen, books, silk-worms and their bags, &c. Sir Hans Sloane says, that the Indians mix their ashes with sugar, and apply them to ulcers in order to promote the suppuration. 8. The *germanica*, is livid and yellowish, with two black parallel lines on the breast. It is found in Denmark. 9. The *japonica*, is yellow, and the elytra are spotted with black. It is found in Lapland; and feeds upon cheese, fishes, &c. 10. The *oblongata* is of an oblong figure; the colour is livid and shining; and it has two black spots on the breast. The feelers are red and clavated; and the feet are very hairy. It is a native of America.

BLATTARIE, (from *Blatta*, a moth or little worm), the title of Scopoli's 12th natural class, in his *Flora Carniolica*. It is taken from the *Blattaria*, which was Tournefort's generic name for the verbascom of Linnaeus. See **VERBASCUM**.

BLAUBEUREN, a town of Germany in the circle of Suabia, and duchy of Wirtemberg. E. Long. 9. 57. N. Lat. 48. 22.

BLAVET, a sea-port town of Brittany in France, situated at the mouth of a river of the same name. It is one of the stations of the royal navy of France, and

is sometimes called *Port Lenois*. W. Long. 3. 5. N. Lat. 47. 40.

BLAVIA, or **BLAVIUM**, (anc. geog.), a town of Aquitain, on the north bank of the Garonne, below its confluence with the Dordone: Now *Blaye*; which see.

BLAYE, an ancient and strong town of France, in Guienne. It is situated on the river Garonne, has a harbour much frequented by foreigners, and the ships which sail to Bourdeaux are obliged to leave their guns here. The river is 3800 yards broad at Blaye; for which reason a battery was built upon an island in 1689, to command the vessels that sail up. The city is built on a rock, and has a citadel with four bastions, which is called the *Upper Town*. The lower town is separated from the upper by a small river; and in the lower town the merchants reside with their magazines. The neighbourhood produces a great deal of corn, which they send abroad when the exportation of it is allowed. W. Long. 1. 23. N. Lat. 45. 6.

BLAZE, a white spot in a horse's face.

BLAZONING, or **BLAZONRY**, in heraldry, the decyphering the arms of noble families. The word originally signified the blowing or winding of a horn; and was introduced into heraldry as a term denoting the description of things borne in arms, with their proper significations and intendments, from an ancient custom the heralds, who were judges, had of winding an horn at jousts and tournament, when they explained and recorded the achievements of knights *.

BLEA, in the anatomy of plants, the inner rind or dry bark. See **PLANTS**.

B L E A C H I N G

IS the art of whitening linen cloth, thread, &c.; which is conducted in the following manner by the bleachers of this country.

After the cloth has been sorted into parcels of an equal fineness, as near as can be judged, they are latched, linked, and then steeped. Steeping is the first operation which the cloth undergoes, and is performed in this manner. The linens are folded up, each piece distinct, and laid in a large wooden vessel; into which is thrown, blood-warm, a sufficient quantity of water, or equal parts of water and lye, which has been used to white cloth only, or water with rye-meal or bran mixed with it, till the whole is thoroughly wet, and the liquor rises over all. Then a cover of wood is laid over the cloth, and that cover is secured with a post betwixt the boards and the joisting, to prevent the cloth from rising during the fermentation which ensues. About six hours after the cloth has been steeped in warm water, and about twelve in cold, bubbles of air arise, a pellicle is formed on the surface of the liquor, and the cloth swells when it is not pressed down. This intestine motion continues from 36 to 48 hours, according to the warmth of the weather; about which time the pellicle or scum begins to fall to the bottom. Before this precipitation happens, the cloth must be taken out; and the proper time for taking it out, is when no more air-bubbles arise. This is allowed to be the justest guide by the most experienced bleachers.

The cloth is then taken out, well rinsed, disposed regularly by the selvage, and washed in the put-mill to carry off the loose dust. After this it is spread on the field to dry: When thoroughly dried, it is ready for bucking; which is the second operation.

Bucking, or the application of salts, is performed in this manner. The first, or mother-lye, is made in a copper, which we shall suppose, for example, when full, holds 170 Scots gallons of water. The copper is filled three fourths full of water, which is brought to boil: just when it begins, the following proportion of ashes is put into it, viz. 30 lb. of blue, and as much white pearl-ashes; 200 lb. of Marcott ashes, (or, if they have not these, about 300 lb. of Cahub); 300 lb. of Muscovy, or blanch ashes; the three last ought to be well pounded. This liquor is allowed to boil for a quarter of an hour, stirring the ashes from the bottom very often; after which the fire is taken away. The liquor must stand till it has settled, which takes at least six hours, and then it is fit for use.

Out of their first, or mother-lye, the second, or that used in bucking, is made in this manner. Into another copper, holding, for example, 40 Scots gallons, are put 38 gallons of water, 2 lb. soft soap, and 2 gallons of mother-lye; or, for cheapness, in place of the soap, when they have lye which has been used to white linen, called *white-linen lye*, they take 14 gallons of it, leaving out an equal quantity of water. This is called *buck-*
ing.

ing-lye.

After the linens are taken up from the field dry, they are set in the *vat* or *cave*, as their large vessel is called, in rows, endwise, that they may be equally wet by the lye; which, made blood-warm, is now thrown on them, and the cloth is afterwards squeezed down by a man with wooden shoes. Each row undergoes the same operation, until the vessel is full, or all the cloth in it. At first the lye is put on milk-warm, and, after standing a little time on the cloth, it is again let off by a cock into the bucking-copper, heated to a greater degree, and then put on the cloth again. This course is repeated, for six or seven hours, and the degree of heat gradually increased, till it is, at the last turn or two, thrown on boiling hot. The cloth remains after this for three or four hours in the lye; after which the lye is let off, thrown away, or used in the first buckings, and the cloth goes on to another operation.

It is then carried out, generally early in the morning, spread on the grass, pinned, corded down, exposed to the sun and air, and watered for the first six hours, so often, that it never is allowed to dry. Afterwards it is allowed to lie till dry spots appear before it is watered. After seven at night it gets no more water, unless it be a very drying night. Next day, in the morning and forenoon, it is watered twice or thrice if the day be very dry; but if the weather be not drying, it gets no water: After which it is taken up dry if the green be clean; if not, it is rinsed, mill-washed, and laid out to dry again, to become fit for bucking.

This alternate course of bucking and watering, is performed for the most part, from ten to sixteen times, or more, before the linen is fit for scouring; gradually increasing the strength of the lye from the first to the middle bucking, and from that gradually decreasing it till the scouring begins. The lyes in the middle buckings are generally about a third stronger than the first and last.

Scouring, or the application of acids to cloth, is the fourth operation. It is difficult to say when this operation should commence, and depends mostly on the skill and experience of the bleacher. When the cloth has an equal colour, and is mostly freed from the sprat, or outer bark of the lint, it is then thought fit for scouring; which is performed in the following manner. Into a large vat or vessel is poured such a quantity of butter-milk, or four milk, as will sufficiently wet the first row of cloth; which is tied up in loose folds, and pressed down by two or three men bare-footed. If the milk is thick, about an eighth of water is added to it; if thin, no water. Sours made with bran, or rye-meal and water, are often used instead of milk, and used milk-warm. Over the first row of cloth a quantity of milk and water is thrown, to be imbibed by the second; and so it is continued till the linen to be scoured is sufficiently wet, and the liquor rises over the whole. The cloth is then kept down by covers filled with holes, and secured with a post fixed to the joist, that it may not rise. Some hours after the cloth has been in the sour, air-bubbles arise, a white scum is found on the surface, and an intestine motion goes on in the liquor. In warm weather it appears sooner, is stronger, and ends sooner, than in cold weather. Just before this fermentation, which lasts five or six days, is finished, at which time the scum falls down, the cloth should be taken out, rinsed, mill-

washed, and delivered to the women to be washed with soap and water.

Washing with soap and water, is the fifth operation; and is performed thus. Two women are placed opposite at each tub, which is made of very thick staves, so that the edges, which slope inwards, are about four inches in thickness. A small vessel full of warm water is placed in each tub. The cloth is folded so that the selvege may be first rubbed with soap and warm water lengthways, till it is sufficiently impregnated with it. In this manner all the parcel is rubbed with soap, and afterwards carried to be bucked.

The lye now used has no soap in it, except what it gets from the cloth: and is equal in strength to the strongest formerly used, or rather stronger, because the cloth is now put in wet. From the former operation these lyes are gradually made stronger, till the cloth seems of an uniform white, nor any darkness or brown colour appears in its ground. After this the lye is more speedily weakened than it was increased; so that the last which the cloth gets, is weaker than any it got before.

But the management of sours is different; for they are used strongest at first, and decreased so in strength, that the last four, considering the cloth is then always taken up wet, may be reckoned to contain three fourths of water.

From the bucking it goes to the watering, as formerly, observing only to overlap the selvages, and tie it down with cords, that it may not tear; then it returns to the four, milling, washing, bucking, and watering again. These operations succeed one another alternately till the cloth is whitened; at which time it is blueed, starched, and dried.

This is the method used in the whitening fine cloths. The following is the method used in the whitening of coarse cloths.

Having sorted the cloths, according to their quality, they are steeped in the same manner as the fine, rinsed, washed in the mill, and dried before boiling.

In this process, boiling supplies the place of bucking, as it takes less time, and consequently is thought cheaper. It is done in the following manner: 200 lb. Cashub-ashes, 100 lb. white Muscovy, and 30 lb. pearl-ashes, boiled in 105 Scots gallons of water for a quarter of an hour, as in the process for the fine cloth, makes the mother or first lye. The cloth-boiler is then to be filled two thirds full with water and mother-lye, about nine parts of the former to one of the latter; so that the lye used for boiling the coarse cloth, is about a third weaker than that used in bucking the fine. Such a quantity of cloth is put into the foregoing quantity of lye, when cold, as can be well covered by it. The lye is brought gradually to the boil, and kept boiling for two hours; the cloth being fixed down all the time, that it does not rise above the liquor. The cloth is then taken out, spread on the field, and watered, as mentioned before in the fine cloth.

As the salts of the lye are not exhausted by this boiling, the same is continued to be used all that day, adding, at each boiling, so much of the mother-lye as will bring it to the same strength as at first. The lye by boiling loses in quantity somewhat betwixt a third and a fourth; and they reckon that in strength it loses about a half, because they find in practice, that adding to it half its former strength in fresh lye, has the same effect

effect on cloth. Therefore some fresh lye, containing a fourth part of the water, and the half of the strength of the first lye, makes the second boiler equal in strength to the first. To the third boiler they add somewhat more than the former proportion, and go on still increasing gradually to the fourth and fifth, which is as much as can be done in a day. The boiler is then cleaned, and next day they begin with fresh lye. These additions of fresh lye ought always to be made by the master-bleacher, as it requires judgment to bring succeeding lyes to the same strength as the first.

When the cloth comes to get the second boiling, the lye should be a little stronger, about a thirtieth part, and the deficiencies made up in the same proportion. For six or seven boilings, or fewer, if the cloth be thin, the lye is increased in this way, and then gradually diminished till the cloth is fit for fouring. The whitest cloth ought always to be boiled first, that it may not be hurt by what goes before.

In this process, if the cloth cannot be got dry for boiling, business does not stop as in the fine; for after the coarse has dreeped on racks made for the purpose, it is boiled, making the lye strong in proportion to the wear in the cloth.

The common method of fouring coarse linen is, to mix some warm water and bran in the vat, then put a layer of cloth, then more bran, water, and cloth; and so on, till the cave is full. The whole is tramped with mens feet, and fixed as in the former process. A thousand yards of cloth, yard-broad, require betwixt four and six pecks of bran. The cloth generally lies about three nights and two days in the four. Others prepare their four twenty-four hours before, by mixing the bran with warm water in a separate vessel; and before pouring it on the cloth, they dilute it with a sufficient quantity of water. After the cloth is taken from the four, it ought to be well washed and rinsed again. It is then given to men to be well soaped on a table, and afterwards rubbed betwixt the rubbing-boards. When it comes from them, it should be well milled, and warm water poured on it all the time, if conveniency will allow of it. Two or three of these rubbings are sufficient, and the cloth very seldom requires more.

The lye, after the fouring begins, is decreased in strength by degrees; and three boilings after that are commonly sufficient to finish the cloth. Afterwards it is starched, blued, dried, and bittled in a machine made for that purpose, which supplies the place of a calender, and is preferred by many to it.

This method used in the bleaching of our coarse cloths, is very like that practised in Ireland for both fine and coarse. The only material difference is, that there the bleachers use no other dyes but the kelp or calhub. A lye is drawn from the former by cold water, which dissolves the salts, and not the sulphureous particles of the kelp-ashes. This lye is used till the cloth is half whitened, and then they lay aside the kelp-lye for one made of calhub-ashes.

In the preceding history of bleaching we may observe, that it naturally divides itself into several different branches or parts, all tending to give linen the degree of whiteness required. How they effectuate that, comes next to be considered.

The general process of bleaching divides itself into these different parts. 1. Steeping and milling. 2. Buck-

ing and boiling. 3. Alternate watering and drying. 4. Souring. 5. Rubbing with soap and warm water, starching, and bluing. We shall treat of these different parts in their order.

STEEPING.

GREEN linen, in the different changes which it has undergone before it arrives at that state, contracts a great foulness. This is chiefly communicated to it by the dressing composed of tallow and sowen, which is a kind of flummery made of bran, flower, or oat-meal seeds. The first thing to be done in the bleachfield is to take off all that filth which is foreign to the flax, would blunt the future action of the salts, and might, in unskilful hands, be fixed in the cloth. This is the design of steeping.

To accomplish this end, the cloth is laid to steep in blood-warm water. A smaller degree of heat would not dissolve the dressing so soon; and the greater might coagulate and fix, in the body of the linen, those particles which we design to carry off. In a few hours the dressing made use in weaving is dissolved, mixed with the water; and, as it had acquired some degree of acidity, before application, it becomes a species of ferment. Each ferment promotes its own particular species of fermentation, or intestine motion; the putrid ferment sets in motion the putrefactive fermentation; the vinous ferment gives rise to the vinous fermentation; and the acid ferment to the acetous fermentation. That there is a real fermentation going on in steeping, one must be soon convinced, who attends to the air-bubbles which immediately begin to arise, to the scum which gathers on the surface, and to the intestine motion and swelling of the whole liquor. That it must be the acetous fermentation, appears from this, that the vegetable particles, already in part soured, must first undergo this process.

The effect of all fermentations is to set the liquor in motion; to raise in it a degree of heat; and to emit air-bubbles, which, by carrying up some of the light oleaginous particles along with them, produce a scum. But as the dressing is in small quantity in proportion to the water, these effects are gentle and slow. The acid salts are no sooner separated, by the acetous fermentation, from the absorbent earth, which made them not perceptible to the tongue in their former state, than they are united to the oily particles of the tallow, which likewise adhere superficially, dissolve them, and render them, in some degree, miscible with water. In this state they are soon washed off by the intestine motion of the liquor. The consequence of this operation is, that the cloth comes out freed in a great measure from its superficial dirt; and more pliant and soft than what it was.

Whenever this intestine motion is pretty much abated, and before the scum subsides, bleachers take out their cloth. The scum, when no more air-bubbles rise to support it, separates and falls down; and would again communicate to the cloth great part of the filth. But a longer stay would be attended with a much greater disadvantage. The putrid follows close upon the acetous fermentation: when the latter ends, the former begins. Were this to take place in any considerable degree, it would render the cloth black and tender. Bleachers cannot be too careful in this article.

The first question that arises to be determined on these

these principles is, What is the properest liquor for steeping cloth? those used by bleachers are plain water; white-linen lye and water, equal parts; and rye-mal or bran mixed with water. They always make use of lye when they have it.

After steeping, the cloth is carried to the puttock-mill, to be freed of all its loose foulness. There can be nothing contrived so effectual to answer the purpose as this mill. Its motion is easy, regular, and safe. While it presses gently, it turns the cloth; which is continually washed with a stream of water. Care must be taken that no water be detained in the folds of the linen, otherwise that part may be damaged.

BUCKING AND BOILING.

This is the most important operation of the whole process, and deserves a thorough examination. Its design is to loosen, and carry off, by the help of alkaline lixives or lyes, that particular substance in cloth, which is the cause of its brown colour.

All ashes used in lye, the pearl excepted, ought to be well pounded, before they are put into the copper; for the Marcott and Cashtub are very hard, and with some difficulty yield their salt. As these two last contain a very considerable proportion of a real sulphureous matter, which must in some degree tinge white cloth; and as this is dissolved much more by boiling, than by the inferior degrees of heat, while the salts may be as well extracted by the latter; the water should never be brought to boil, and should be continued for some time longer under that degree of heat. The pearl-ashes should never be put in till near the end, as they are easily dissolved in water.

If the salts were always of an equal strength, the same quantities would make a lye equally strong; but they are not. Salts of the same name differ very much from one another. The Muscovy ashes are turning weaker every day, as every bleacher must have observed, till at last they turn quite effete. A decoction from them when new, must differ very much from one when they have been long kept. Hence a necessity of some exact criterion to discover when lyes are of an equal strength. The taste cannot serve, as that is so variable, cannot be described to another, and is blunted by repeated trials. The proof-ball will serve the purpose of the bleachfield sufficiently; and, by discovering the specific gravity, will show the quantity of alkaline salts dissolved. But it cannot show the dangerous qualities of these salts; for the less caustic and less heavy this liquor is, the more dangerous and corrosive it may be for the cloth.

The third lye, which they draw from these materials by an infusion of cold water, in which the taste of lime is discoverable, appears plainly to be more dangerous than the first. The second lye, which they extract from the same ashes, and which is reckoned about a third in strength, when compared to the first, must be of the same nature; nor should it be used without an addition of pearl-ashes, which will correct it.

It is taken for a general rule, That the solution of any body in its menstruum is equally diffused through the whole liquor. The bleachers depending on this, use equal quantities of the top and bottom of their lye, when once clear and settled; taking it for granted, that there is an equal quantity of salts in equal quantities of the lye. But if there is not, the mistake may be of

fatal consequence, as the lye may be in some places stronger than what the cloth can with safety bear. That general law of solution must have taken its rise from particular experiments, and not from reasoning. Whether a sufficient number of experiments have been tried to ascertain this point, and to establish an undoubted general rule, may be called in question.

"But, says Dr Home, when I had discovered that lime makes part of the dissolved substance, and reflected how long its grosser parts will continue suspended in water, there appeared stronger reasons for suspecting that this rule, tho' it may be pretty general, does not take place here; at least it is worth the pursuit of experiment.

"I weighed at the bleachfield a piece of glass in some cold lye, after it had been boiled, stood for two days, and about the fourth part of it had been used. The glass weighed 3 drachms $1\frac{1}{2}$ grains in the lye, and 3 drachms $7\frac{1}{2}$ grains in river-water. The same glass weighed in the same lye, when almost all used, 2 grains less than it had done before. This shows, that the last of the lye contained a third more of the dissolved body; and, consequently, was a third stronger than the first of the lye.

"As this might, perhaps, be owing to a continuation of the solution of the salts, I repeated the experiment in a different way.

I took from the surface some of the lye, after the salts were dissolved, and the liquor was become clear. At the same time I immersed a bottle, fixed to a long stick, so near the bottom, as not to raise the ashes there, and, by pulling out the cork by a string, filled the bottle full of the lye near the bottom. The glass weighed in river-water 3 drachms $38\frac{1}{2}$ grains; in the lye taken from the surface 3 drachms $34\frac{1}{2}$ grains; and in the lye taken from the bottom 3 drachms $31\frac{1}{2}$ grains. This experiment shows, that the lye at the bottom was, in this case, $\frac{1}{4}$ stronger than the lye at the surface.

"At other times when I tried the same experiment, I found no difference in the specific gravity; and therefore, I leave it as a question yet doubtful, though deserving to be ascertained by those who have an opportunity of doing it. As the lye stands continually on the ashes, there can be no doubt but what is used last must be stronger than the first. I would, therefore, recommend, to general practice, the method used by Mr John Christie, who draws off the lye, after it has settled, into a second receptacle, and leaves the ashes behind. By this means it never can turn stronger; and he has it in his power to mix the top and bottom, which cannot be done so long as it stands on the ashes."

Having considered the lye, let us next inquire how it acts. On this inquiry depends almost the whole theory of bleaching, as its action on cloth is, at least in this country, absolutely necessary. It is found by experiment, that one effect they have on cloth is the diminishing of its weight; and that their whitening power is, generally, in proportion to their weakening power. Hence arises a probability, that these lyes act by removing somewhat from the cloth, and that the loss of this substance is the cause of whiteness. This appears yet plainer, when the bucking, which lasts from Saturday night to Monday morning, is attended to.

There

There are various and different opinions with regard to the operations of these salts: that they act by altering the external texture of the cloth, or by separating the mucilaginous parts from the rest, or by extracting the oil which is laid up in the cells of the plant. The last is the general opinion, or rather conjecture, for none of them deserves any better name; but we may venture to affirm, that it is so without any better title to pre-eminence, than what the others have. Alkaline salts dissolve oils, therefore these salts dissolve the cellular oil of the cloth, is all the foundation which this theory has to rest on; too slight, when unsupported by experiment, to be relied on.

Dr Home endeavours to settle this question by the following experiments and observations.

"Wax, says he, is whitened by being exposed to the influence of the sun, air, and moisture. A discovery of the change made on it by bleaching, may throw a light upon the question.

"Six drachms of wax were sliced down, exposed on a fourth window, September 10. and watered. That day being clear and warm, bleached the wax more than all the following. It seemed to me to whiten quicker when it had no water thrown on it, than when it had. September 15. it was very white, and 1 drachm 3 grains lighter. $3\frac{1}{2}$ drachms of this bleached wax, and as much of unbleached, taken from the same piece, were made into two candles of the same length and thickness, having cotton wicks of the same kind. The bleached candle burnt 1 hour 33 minutes; the unbleached 3 minutes longer. The former run down four times, the latter never. The former had an obscure light and dull flame; the latter had a clear pleasant one, of a blue colour at the bottom. The former when burning seemed to have its wick thicker, and its flame nearer the wax, than the latter. The former was brittle, the latter not. It plainly appears from these facts, that the unbleached wax was more inflammable than the bleached; and that the latter had lost so much of an inflammable substance, as it had lost in weight; and consequently the substance lost in bleaching of wax is the oily part.

"As I had not an opportunity of repeating the former experiment, I do not look on it as entirely conclusive; for it is possible that some of the dust, flying about in the air, might have mixed with the bleached wax, and so have rendered it less inflammable. Nor do I think the analogical reasoning from wax to linen without objections. Let us try then if we cannot procure the substance extracted from the cloth, show it to the eye, and examine its different properties. The proper place to find it, is in a lye already used, and fully impregnated with these colouring particles.

"I got in the bleachfield some lye, which had been used all that day for boiling coarse linen, which was tolerably white, and had been twice boiled before. There could be no dressing remaining in these webs. No soap had ever touched that parcel; nor do they mix soap with the lye used for coarse cloth. Some of this impregnated lye was evaporated, and left a dark coloured matter behind. This substance felt oily betwixt the fingers, but would not lather in water as soap does. It deflagrated with nitre in fusion, and afforded a tincture to spirit of wine. By this experiment the salts

seem to have an oily inflammable substance joined with them.

"Could we separate this colouring substance from these salts, and exhibit it by itself, so that it might become the object of experiment, the question would be soon decided. Here chemistry lends us its assistance. Whatever has a stronger affinity or attraction to the salts with which it is joined, than this substance has, must set it at liberty, and make it visible. Acids attract alkaline salt from all other bodies; and therefore will serve our purpose.

"Into a quantity of the impregnated lye mentioned in the former experiment, I poured in oil of vitriol. Some bubbles of air arose, an intestine motion was to be perceived, and the liquor changed its colour from a dark to a turbid white. It curdled like a solution of soap, and a scum soon gathered on the surface, about half an inch in thickness, the deepness of the liquor not being above six inches. What was below was now pretty clear. A great deal of the same matter lay in the bottom; and I observed, that the substance on the surface was precipitated, and showed itself heavier than water, when the particles of air, attached to it in great plenty, were dispelled by heat. This substance was in colour darker than the cloth which had been boiled in it.

"I procured a considerable quantity of it by skimming it off. When I tried to mix it with water, it always fell to the bottom. When dried by the air, it diminished very much in its size, and turned as black as a coal. In this state it deflagrated strongly with nitre in fusion; gave a strong tincture to spirit of wine; and when put on a red-hot iron, burnt very slowly, as if it contained a heavy ponderous oil; and left some earth behind.

"From the inflammability of this substance, its rejecting of water, and dissolving in spirit of wine, we discover its oleaginous nature; but from its great specific gravity we see that it differs very much from the expressed or cellular oil of vegetables; and yet more from their mucilage. That it dissolves in spirit of wine, is not a certain argument of its differing from expressed oils; because these, when joined to alkaline salts, and recovered again by acids, become soluble in spirit of wine. The quantity of earthy powder left behind after burning, shows that it contains many of the solid particles of the flax. The substance extracted from cloth by alkaline lyes appears then to be a composition of a heavy oil, and the solid earthy particles of the flax.

"In what manner these salts act so as to dissolve the oils, and detach the solid particles, is uncertain; but we see evidently how much cloth must be weakened by an improper use of them, as we find the solid particles themselves are separated."

It is necessary that cloth should be dry before bucking, that the salts may enter into the body of the cloth along with the water; for they will not enter in such quantity, if it be wet; and by acting too powerfully on the external threads, may endanger them.

The degree of heat is a very material circumstance in this operation. As the action of the salts is always in proportion to the heat, it would appear more proper to begin with a boiling heat, by which a great deal of time and labour might be saved. The reason

reason why this method is not followed, appears to be this. If any vegetable or vegetable substance is to be softened, and to have its juices extracted, it is found more proper to give it gentle degrees of heat at first, and to advance gradually, than to plunge it all at once in boiling water. This last degree of heat is so strong, that when applied at once to a vegetable, it hardens, instead of softening its texture. Dried vegetables are immediately put into boiling water by cooks, that these substances may preserve their green colour, which is only to be done by hindering them from turning too soft. Boiling water has the same effect on animal substances; for if salt beef is put into it, the water is kept from getting at the salts, from the outside of the beef being hardened.

But when we consider how much of an oily substance there is in the cloth, especially at first, which will for some time keep off the water, and how the twisting of the threads, and closeness of the texture, hinders the water from penetrating, we shall find, that if boiling water were put on it at once, the cloth might be liable, in several parts, to a dry heat, which would be much worse than a wet one. That the lyes have not access to all parts of the cloth, at first, appears plainly from this, that when it has lain, after the first bucking, till all the lyes are washed out, it is as black, in some parts, as when it was steeped. This must be owing to the discharge of the colouring particles from those places to which the lye has access, and to their remaining where it has not. It would seem advisable, then, in the first bucking or two, when the cloth is foul, to use the lye considerably below the boiling point; that by this soaking or maceration, the foulness may be entirely discharged, and the cloth quite-opened for the speedy reception of the boiling lye in the buckings which follow.

The lyes should likewise be weakest in the first buckings, because then they act only on the more external parts; whereas, when the cloth is more opened, and the field of action is increased, the active powers ought to be so too. For this reason they are at the strongest after some fourings.

The only thing that now remains to be considered, is, the management of the coarse cloth, where boiling is substituted in place of bucking. This species of linen cannot afford the time and labour necessary for the latter operation; and therefore they must undergo a shorter and more active method. As the heat continues longer at the degree of boiling, the lyes used to the coarse cloth must be weaker than those used to the fine. There is not so much danger from heat in the coarse as in the fine cloth, because the former is of a more open texture, and will allow the lye to penetrate more speedily. In the closer kinds, however, the first application of the salts should be made without a boiling heat.

ALTERNATE WATERING AND DRYING.

AFTER the cloth has been bucked, it is carried out to the field, and frequently watered for the first six hours. For if, during that time, when it is strongly impregnated with salts, it is allowed to dry, the salts approaching closer together, and, assisted by a greater degree of heat, increasing always in proportion to the dryness of the cloth, act with greater force, and de-

stroy its very texture. After this time, dry spots are allowed to appear before it gets any water. In this state it profits most, as the latter part of the evaporation comes from the more internal parts of the cloth, and will carry away most from those parts. The bleaching of the wax, in a preceding experiment, helps to confirm this; for it seemed to whiten most when the salt particles of water were going off.

This continual evaporation from the surface of the cloth shows, that the design of the operation is to carry off somewhat remaining after the former process of bucking. This appears likewise from a fact known to all bleachers, that the upper side of cloth, where the evaporation is strongest, attains to a greater degree of whiteness than the under side. But it is placed beyond all doubt by experiment, which shews, that cloth turns much lighter by being exposed to the influence of the sun, air, and winds, even tho' the salts have been washed out of it.

What, then, is this substance? As we have discovered in the former section, that the whitening, in the operation of bucking, depends on the extracting or loosening the heavy oil, and solid particles of the flax; it appears highly probable, that the effects of watering, and exposition to the sun, air, and winds, are produced by the evaporation of the same substance, joined to the salts, with which composite body the cloth is impregnated when exposed on the field. That these salts are in a great measure carried off or destroyed, appears from the cloth's being allowed to dry without any danger, after the evaporation has gone on for some time. "If we can show (says Dr Home) that oils and salts, when joined together, are capable of being exhaled, in this manner, by the heat of the atmosphere, we shall reduce this question to a very great degree of certainty.

"September 10. I exposed in a south-west window, half an oz. of Castile soap, sliced down and watered. September 14. when well dried, it weighed but 3 dr. 6 gr. September 22. it weighed 2 dr. 2 gr. September 24. it weighed 1 dr. 50 gr. It then seemed a very little whiter; but was much more mucilaginous in its taste, and had no degree of saltiness, which it had before.

"It appears from this experiment, that soap is so volatile, when watered, and exposed to air not very warm, that it loses above half its weight in 14 days. The same must happen to the saponaceous substance, formed from the conjunction of the alkaline salts, heavy oil, and earthy particles of the flax. The whole design, then, of this operation, which, by way of pre-eminence, gets the name of *bleaching*, is to carry off, by the evaporation of water, whatever has been loosened by the former process of bucking.

"Against this doctrine there may be brought two objections, seemingly of great weight. It is a general opinion amongst bleachers, that linen whitens quicker in March and April, than in any other months: but as the evaporation cannot be so great at that time, as when the sun has a greater heat; hence the whitening of cloth is not in proportion to the degree of evaporation; and therefore the former cannot be owing to the latter. This objection vanishes, when we consider, that the cloth which comes first into the bleachfield, in the spring, is closely attended, having no other to interfere

with it for some time; and, as it is the whitest, gets, in the after-buckings, the first of the lye; while the second parcel is often bucked with what has been used to the first. Were the fact true, on which the objection is founded, this would be a sufficient answer to the objection. But it appears not to be true, from an observation of Mr John Christie, That cloth laid down in the beginning of June, and finished in September, takes generally less work, and undergoes fewer operations, than what is laid down in March, and finished in June.

"The other objection is, That cloth dries much faster in windy weather than in calm sunshine; but it does not bleach so fast. This would seem to show, that the sun has some particular influence independent on evaporation. In answer to this objection, let it be considered, that it is not the evaporation from the surface, but from the more internal parts, that is of benefit to the cloth. Now, this latter evaporation must be much stronger in sunshine than in windy weather, on account of the heat of the sun, which will make the cloth more open; while the coldness of windy weather must shut it up, so that the evaporation will all be from the surface. Clear sunshine, with a very little wind, is observed to be the best weather for bleaching; a convincing proof that this reasoning is just.

"It would seem to follow as a corollary from this reasoning, that the number of waterings should in general be in proportion to the strength of the lye; for the stronger the lye is, the more there is to be evaporated; and the greater the danger, in case the cloth should be allowed to dry. But there is an exception to this general rule, arising from the consideration of another circumstance. It is observed, that cloth when brown, dries sooner than when it becomes whiter, arising from the closeness and oiliness which it then has not allowing the water a free passage. Perhaps that colour may retain a greater degree of heat, and in that way assist a very little. Cloth therefore, after the first buckings, must be more carefully watered than after the last.

"It follows likewise from this reasoning, that the soil of the bleach-field should be gravelly or sandy, that the water may pass quickly through it, and that the heat may be increased by the reflection of the soil, for the success of this operation depends on the mutual action of heat and evaporation. It is likewise necessary that the water should be light, soft, and free from mud or dirt, which not being able to rise along with the water, must remain behind. When there is much of this, it becomes necessary to rinse the cloth in water, and then give it a milling, to take out the dirt; else it would be fixed in the cloth by the following bucking, as it is not soluble by the lye.

"This operation has more attributed to it by bleachers than it can justly claim. The cloth appears, even to the eye, to whiten under these alternate waterings and dryings; and these naturally get the honour of it, when it more properly belongs to the former operation. Here lies the fallacy. Alkaline salts give a very high colour to the decoctions or infusion of vegetables. This is probably owing to the solution of the oleaginous colouring particles of the plant; which particles, being opened and separated by the salts, occupy a greater space, and give a deep colour to the liquor. The cloth

participates of the liquor and colour. Hence bleachers always judge of the goodness of the bucking by the deepness of its colour. The rule, in general, is good. I observe that in those buckings which continue from the Saturday night to the Monday morning, the cloth has always the deepest colour. When that cloth has been exposed some hours to the influence of the air, these colouring particles which are but loosely attached to it, are evaporated, and the linen appears of a brighter colour. This operation does no more than complete what the former had almost finished. If its own merit were thoroughly known, there would be no occasion to attribute that of another operation to it. Thread, and open cloths, such as diaper, may be reduced to a great degree of whiteness, after one bucking, by it alone. No cloth, as would appear, can attain to a bright whiteness without it.

"Since the only advantage of watering is the removal of the salts, and what they have dissolved, might we not effectuate this by some cheaper and more certain method? For it occupies many hands; and must depend altogether on the uncertainty of the weather; so that in the beginning of the season, the bleacher is often obliged to repeat his buckings without bleaching. We might take out the alkaline salts by acids; but then the other substance would be left alone in the cloth, nor would any washing be able to remove it. Mill-washing appears a more probable method of taking out both salts and oils: and it would seem that this might in a great measure, supply the place of watering; but upon trial it does not succeed. Two parcels of linen were managed equally in every other respect, except in this, that one was watered, and exposed to the influence of the air, and the other was only mill-washed. This method was followed until they were fit for souring. The cloth which had been mill-washed had a remarkable green colour, and did not recover the bright colour of the pieces managed in the common way, until it had been treated like them for a fortnight. The green colour was certainly owing to a precipitation of the sulphureous particles, with which the lye is impregnated, upon the surface of the cloth; owing to the salts being washed off more speedily than the sulphur, to which they are united in the lye. The attachment betwixt these two bodies we know is very loose, and the separation easily made. Evaporation then alone is sufficient to carry off these sulphureous particles."

SOURING.

It is well known to all chymists, that alkaline salts are convertible, by different methods, into absorbent earths. Frequent solution in water, and evaporation of it again, is one of these. This transmutation then of these salts, which are not volatilised or washed away, must be continually going on in the cloth under these alternate waterings and dryings of the former process: not much indeed after the first two or three buckings; because the salts, not having entered deep into the cloth, are easily washed off, or evaporated. But when they penetrate into the very composition of the last and minutest fibres, of which the first vessels are made, they find greater difficulty of escaping again, and must be more subject to this transmutation. But if we consider the bleaching ashes as a composition of lime and alkaline salts, we must discover a fresh fund for the deposition

position of this absorbent earth. The common caustic, a composition of this very kind, soon converts itself, if exposed to the open air, into a harmless earthy powder.

Frequent buckings and bleachings load the cloth with this substance. It becomes then necessary to take it out. No washing can do that, because earth is not soluble in water. Nothing but acids can remove it. These are attracted by the absorbent earth, join themselves to it, and compose a kind of neutral imperfect salt, which is soluble in water, and therefore easily washed out of the cloth. The acid liquors commonly used are butter-milk, which is reckoned the best, four-milk, infusion of bran, rye-meal, &c. kept for some days till they sour. Sour whey is thought to give the cloth a yellow colour.

The linen ought to be dried before it is put in the four, that the acid particles may penetrate, along with the watery, through the whole. A few hours after it has been there, air-bubbles arise, the liquor swells, and a thick foam is formed; manifest signs of a fermentation. The following experiment, says Dr Home, shews the degree of heat which attends it.

" May 25. I put a thermometer of Fahrenheit's into some butter-milk, of which the bleachers were composing their fours, and which stood in a vat adjoining to another, where the milk was the same, and the fouring process had been going on for two days. After the thermometer had been 20 minutes in the butter-milk, the mercury stood at 64 degrees. In the fouring vat it rose to 68 degrees. An increase of four degrees shows a pretty brisk intestine motion.

" To what are all these effects owing? To the acetous fermentation going on in those vegetable liquors, whose acids, extricating themselves, produce heat, intestine motion, and air-bubbles. As the change is slow, the process takes five or six days before it is finished. During this time the acid particles are continually uniting themselves to the absorbent earth in the cloth. That this fermentation goes on in the liquor alone, appears from this consideration, that the same effects, viz. air-bubbles, and foam, are to be seen in the butter-milk alone. The only effect then it has is, by the small degree of heat, and intestine motion, which attend it, to assist the junction of the acid and absorbent particles. We shall presently see that this process may be carried on to as great advantage, without any fermentation; and therefore it appears not absolutely necessary.

" When these absorbent particles are fully saturated, the remaining acids may unite with, and have some small effect in extracting, the colouring particles. This appears from the two following experiments.

" Sept. 20. A piece of cloth which had been steeped, weighing $4\frac{1}{2}$ gr. was put into a half-pound of butter-milk, whigged, and well soured, by a mixture of water, and by boiling. Sept. 24. When taken out, and washed in water, it appeared a very little whiter. The mineral acids, as will appear afterwards, whiten cloth, even though they are very much diluted.

" Just before the acetous fermentation is finished, the cloth should be taken out; otherwise the foam will fall down and lodge in the cloth, and the putrefaction which then begins will weaken it. This appears from the following experiment.

" Sept. 16. A piece of cloth weighing 42 gr. was laid in butter-milk unwhigged. Novem. 15. The

milk had a putrid smell. The cloth was a little whiter, but very tender; and weighed, when well washed in warm water and dried, 40 gr."

All the fours made of bran, rye-meal, &c. ought to be prepared before use; for by this means so much time will be saved. Besides, when the water is poured upon the cloth and bran, as is done in the management of coarse cloth, the linen is not in a better situation than if it had been taken up wet from the field; and by this means the acid particles cannot penetrate so deep. Again, this method of mixing the bran with the cloth, may be attended with yet worse consequences. All vegetable substances, when much pressed, fall into the putrescent, and not the acetous fermentation. This often happens to the bran pressed between the different layers on the linen, which must weaken the cloth. Hence, all fours should be prepared before the cloth is steeped in them; and none of the bran or meal should be mixed with the cloth.

The fours are used longest at first, and gradually weakened till the cloth has attained to its whiteness. In the first fourings, there is more of the earthy matter in the cloth, from the many buckings it has undergone, than what there can be afterwards. As the quantity of this matter decreases, so should the strength of the four. There is not, however, the least danger, at any time, from too strong a four.

What is most wanted in this operation is a more expeditious and cheaper method of obtaining the same end. As it takes five or six days, it retards the whitening of the cloth considerably; and as bleachers are obliged to send for milk to a great distance, it becomes very dear. This last consideration makes them keep it so long, that, when used, it can have no good effect; perhaps it may have a bad one.

There is one consideration that may lead us to shorten the time. It is observed, that the fouring process is sooner finished in warm than in cold weather. Heat quickens the fermentation, by aiding the intestine motion. The vats therefore should not be buried in the ground, as they always are, which must keep them cold; there should rather be pipes along the walls of the room, to give it that degree of heat which, on trial, may be found to answer best. There are few days in summer so hot as is necessary; and the beginning and end of the season is by much too cold. That this is no ideal scheme, the following fact is a sufficient proof. There are two vats in Salton bleachfield, adjoining to a partition-wall, at the back of which there is a kitchen-fire. In these vats the fouring process is finished in three days, whereas it lasts five or six days in the other placed round the same room.

This improvement, tho' it shortens the time of fouring a very little, yet is no remedy against the scarcity and dearth of milk fours. Such a liquor as would serve our purpose, must be found either among the vegetable acids, which have no further fermentation to undergo, or among the mineral acids. The former are a large class, and contain within themselves many different species; such as the acid juice of several plants, vinegars made of fermented liquors, and acid salts, called *tartars*. But there is one objection against these vegetable acids: they all contain, along with the acid, a great quantity of oily particles, which would not fail to discolour the cloth. Besides, the demand of

the bleachfields would raise their price too high.

The mineral acids have neither of these objections. They are exceedingly cheap, and contain no oil. "I will freely own, says Dr Home, that at first I had no great opinion of success from the mineral, from two reasons; their want of all fermentation, which I then looked on as necessary; and their extreme corrosiveness. But the experience of two different summers, in two different bleachfields, has convinced me, that they will answer all the purposes of the milk and bran fours; nay, in several respects, be much preferable to them. I have seen many pieces of fine cloth, which had no other fours but those of vitriol, and were as white and strong as those bleached in the common way. I have cut several webs through the middle, and bleached one half with milk, and the other with vitriol; gave both the same number of operations, and the latter were as white and strong as the former."

The method in which it has been hitherto used is this. The proportion of the oil of vitriol to the water, with which it is diluted, is half an ounce, or at most three quarters, to a gallon of water. As the milk-fours are diminished in strength, so ought the vitriol-fours. The whole quantity of the oil of vitriol to be used, may be first mixed with a small quantity of water, then added to the whole quantity of water, and well mixed together. The water should be milk-warm; by which means the acid particles will penetrate further, and operate sooner. The cloth should then be put dry into the liquor.

It is observed, that this four performs its task much sooner than those of milk and bran; so that Mr John Chrystie, in making the trial, used to lay the milk-fours 24 hours before the vitriol. Five hours will do as much with this four, as five days with the common sort. But the cloth can receive no harm in allowing it to remain for some days in the four; but rather, on the contrary, an advantage. The cloth is then taken out, well rinsed, and mill-washed in the ordinary way.

The liquor, while the cloth lies in this four, is less acid the second day than the first, less the third than the second, and so diminishes by degrees. At first it is clear, but by degrees a mucilaginous substance is observed to float in it, when put into a glass. This foulness increases every day. This substance, extracted by the acid, is the same with what is extracted by the alkaline salts; and blunts the acidity of the former, as it does the alkalies of the latter. Hence the liquor loses by degrees its acidity. But as the acid salts do not unite so equally with oily substance as the alkaline do, the liquor is not so uniformly tinged in the former as in the latter case, and the mucous substance presents itself floating in it.

It is observed, that, in the first fouring, which is the strongest, the liquor, which was a pretty strong acid before the cloth was put in, immediately afterwards becomes quite vapid; a proof how very soon it performs its task. But in the following operations, as the linen advances in whiteness, the acidity continues much longer; so that in the last operations the liquor loses very little of its acidity. This happens although the first buckings, after the first fourings, are increased in strength, while the fours are diminished. There are two causes to which this is owing. The texture of the cloth is now so opened, that although the lyes are strong, the alka-

line salts and absorbent earth are easily washed out; and the oily particles are, in a great measure, removed which help to blunt the acidity of the liquor.

Two objections are made against the use of vitriol-fours. One is, that the process of fouring with milk is performed by a fermentation; and, as there is no fermentation in the vitriol-fours, they cannot serve the purpose so well: the other, that they may hurt the texture of the cloth. The answer to the former objection is very short; that the vitriol-fours operate successfully without a fermentation, as experience shows; and therefore in them a fermentation is not necessary.

As to the latter objection, that oil of vitriol, being a very corrosive body, may hurt the cloth; that will vanish likewise, when it is considered how much the vitriol is diluted with water, that the liquor is not stronger than vinegar, and that it may be safely taken into the human body.

That it may be used with safety, much stronger than what is necessary in the bleachfield, appears from the following experiment with regard to the stamping of linen. After the linen is boiled in a lye of ashes, it is bleached for some time. After this, in order to make it receive the colour, it is steeped in a four of water and oil of vitriol, about 15 times stronger than that made use of in the bleachfield; for, to 100 gallons of water are added two and a half of oil of vitriol. Into this quantity of liquor, made so warm as the hand can just be held in it, is put seven pieces of 28 yards each. The linen remains in it about two hours, and comes out remarkably whiter. The fine cloth often undergoes this operation twice. Nor is there any danger if the oil of vitriol is well mixed with the water. But if the two are not well mixed together, and the oil of vitriol remains in some parts undiluted, the cloth is corroded into holes.

Let us now take a view of the advantages which the vitriol-fours must have over the milk. The latter is full of oily particles, some of which must be left in the cloth: but the case is worse when the scum is allowed to precipitate upon the cloth. The former is liable to neither of these objections.

The common fours hasten very fast to corruption; and if, from want of proper care, they ever arrive at that state, must damage the cloth very much. As the milk is kept very long, it is often corrupted before it is used; and, without acting as a four, has all the bad effects of putrefaction. The vitriol-fours are not subject to putrefaction.

The milk takes five days to perform its task; but the vitriol-fours do it in as many hours; nay, perhaps as many minutes. Their junction with the absorbent particles in the cloth must be immediate, whenever these acid particles enter with the water. An unanswerable proof that the fact is so, arises from the circumstances which happen when the cloth is first steeped in the vitriol-four; the cloth has no sooner imbibed the acid liquor, than it loses all acidity, and becomes immediately vapid. This effect of vitriol-fours must be of great advantage in the bleachfield, as the bleachers are at present hindered from enjoying the season by the tediousness of the fouring process. The whole round of operations takes seven days; to answer which they must have seven parcels, which are often mixing together, and causing mistakes. As three days, at most, will be sufficient for all the operations when vitriol-fours are used,

used, there will be no more than three parcels. The cloth will be kept a shorter time in the bleachfield, and arrive sooner at market.

The milk-fours are very dear, and often difficult to be got; but the vitriol are cheap, may be easily procured, and at any time.

There is yet another advantage in the use of vitriol, and that is its power of whitening cloth. Even in this diluted state, its whitening power is very considerable. We have already seen, that it removes the same colouring particles, which the alkaline lixes do. What of it then remains, after the alkaline and absorbent particles are neutralized in the cloth, must act on these colouring particles, and help to whiten the cloth. That this is really the case, appears from the following fact. Mr Chrystie being obliged to chuse 20 of the whitest pieces out of 100, five of the twenty were taken out of seven pieces which were bleached with vitriol.

From both experience and reason, it appears, that it would be for the advantage of our linen-manufacture to use vitriol in place of milk-fours.

HAND-RUBBING with Soap and Warm Water, RUBBING-BOARDS, STARCHING, and BLUING.

AFTER the cloth comes from the souring, it should be well washed in the washing-mill, to take off all the acid particles which adhere to its surface. All acids decompose soap, by separating the alkaline salts and oily parts from one another. Were this to happen on the surface of the cloth, the oil would remain; nor would the washing-mill afterwards be able to carry it off.

From the washing-mill the fine cloth is carried to be rubbed by womens hands, with soap and water. As the liquors, which are generally employed for souring, are impregnated with oily particles, many of these must lodge in the cloth, and remain, notwithstanding the preceding milling. It is probable, that all the heavy oils are not evaporated by bleaching. Hence it becomes necessary to apply soap and warm water, which unite with, dissolve, and carry them off. It is observed, that if the cloth, when it is pretty white, gets too much soap, the following bleaching is apt to make it yellow; on that account they often wring out the soap.

It is a matter worth inquiring into, whether hard or soft soap is best for cloth. Most bleachers agree, that hard soap is apt to leave a yellowness in the cloth. It is said, that the use of hard soap is discharget in Holland. As there must be a considerable quantity of sea-salt in this kind, which is not in the soft, and as this salt appears prejudicial to cloth, the soft soap ought to be preferred.

The management of the coarse cloth is very different, in this operation, from fine. Instead of being rubbed with hands, which would be too expensive, it is laid on a table, run over with soap, and then put betwixt the rubbing-boards, which have ridges and grooves from one side to another, like teeth. These boards have small ledges to keep in the soap and water, which saves the cloth. They are moved by hands, or a water-wheel, which is more equal and cheaper. The cloth is drawn, by degrees, through the boards, by men who attend; or, which is more equal and cheaper, the same water-wheel moves two rollers, with ridge and groove, so that the former enters the latter, and, by a gentle motion round their own axis, pull the cloth gradually

through the boards.

This mill was invented in Ireland about thirty years ago. The Irish bleachers use it for their fine, as well as coarse cloth. These rubbing-boards were discharged, some years ago, in Ireland, by the trustees for the manufactures of that country, convinced from long experience of their bad effects. But as proper care was not taken to instruct the bleachers by degrees in a safer method, they continued in the old, made a party, and kept possession of the rubbing-boards. There were considerable improvements made in them in this country; such as the addition of the ledges, to keep the cloth moist; and of the rollers, which pull the cloth more gradually than mens hands. These improvements were first made in Salton bleachfield.

The objections against these rubbing-boards, are unanswerable. By rubbing on such an unequal surface, the solid fibrous part of the cloth is wore; by which means it is much thinned, and in a great measure weakened before it comes to the market. As a proof of this, if the water which comes from the cloth in the rubbing-boards be examined, it will be found full of cottony fibrous matter. These boards give the cloth a cottony surface, so that it does not keep long clean. Again, they flatten the threads, and take away all that roundness and firmness, which is the distinguishing property of cloth bleached in the Dutch method.

For these reasons they must be very prejudicial to fine cloth, and should never be used in bleaching it. As they seem to be, in some measure, necessary to lessen the expence of bleaching coarse linen, they ought never to be used above twice, or thrice at most. They might be rendered much more safe, by lining their infides with some soft elastic substance, that will not wear the cloth so much as the wooden teeth do. Mr Chrystie at Perth has lined his boards with short hair for some years past, and finds that it answers very well.

After the coarse linen has undergone a rubbing, it should be immediately milled for an hour, and warm water poured now and then on it to make it lather. This milling has very good effects; for it cleans the cloth of all the dirt and filth which the rubbing-boards have loosened, and which, at the next boiling, would discolour the cloth. Besides, it is observed, that it makes the cloth less cottony, and more firm, than when whitened by rubbing alone.

The last operation is that of starching and bluing. It often happens, that the cloth, when exposed to the weather to be dried after this operation, gets rain: which undoes all again, and forces the bleacher to a new expence. To remedy this inconvenience, Mr Chrystie, some years ago, invented the dry-house, where the cloth may be dried, after this operation, in any weather. This invention meets with universal approbation.

A METHOD OF BLEACHING SAFELY WITH LIME.

Dr Home has found by repeated trials, that alkaline salts added to lime, diminish its power of weakening and corroding cloth; and that in proportion to the quantity of these salts added to the lime. This composition, as it is not so dangerous as lime alone, so it is not so expeditious in whitening. When equal parts of each are used, the whitening power is strong, and the weakening power not very considerable; so that

they

they might be used with safety to bleach cloth, in the proportion of one part of lime to four of pure alkaline salts. This fully accounts for an observation made by all bleachers, That the bleaching salts, when mixed together, operate safer and better than when used separately. For the corrosive power of the Muscovy, Maroiti, and Castub ashes is corrected by the pearl ashes, and the whitening quality of the latter is increased by that of the former.

There is not a more corroding substance, with regard to animals, than alkaline salts and lime joined together, especially when fused in the fire. This is the composition of the common caustic. But lime, and lime-water alone, preserve animal substances in a sound entire state. It appears then surprising, that salts and lime should be found so little destructive of cloth, when lime, or lime-water alone, destroys it so remarkably. But that this is a fact, is made evident by many experiments, and has been practised both with success and safety, by a bleacher who gives the following account of his method of bleaching with lime.

“First (says he) I steep the cloth in warm water for 24 hours; then clean it in a washing-mill, of all the dressing, or fowen, as the vulgar term it. Afterwards I buck cloth with cow-dung and water, and bleach it with this for three days; then clean it again, and boil it with a lye made of Castub ashes. A pound to each piece of 18 or 20 yards long is sufficient. This I do twice, as no lime ought to be given to cloth before it is a full third whitened; as it by no means advances the whitening of the cloth, but, on the contrary, protracts it: For, instead of loosening the oil and dirt in the cloth, when brown, it rather fixes them; just as when fine cloth is bucked with over-warm lyes in the first buckings. Lime is by no means fit for discharging the oil in the cloth, but for cleaning it of the dead part, commonly called *sprat*. The cloth, being cleaned, is laid upon a drepper. It must not be drier before bucking with lime, otherwise it will take in more than can be got out again before the next application: for as I have observed already, that lime is only fit for discharging the dead part, bucking thus wet makes it rest on the outside of the cloth. I take a lippy of the finest and richest powdered lime that can be got, of the brightest white colour, as poor lime does more hurt than good, to thirty pieces of the above length; and make a cold lye of it, by stirring and pouring water off the lime, until all be dissolved, but the dross, which is thrown away: then I add a little soap, which makes the lye have the nearest resemblance to milk that breaks in boiling, of any thing I can think of: for this soap blunts the hotness of the lime. Then I take the cloth, and dip it in the lime-lye, and that moment out again, and lay it on a drepper until it be bucked; then put it on the field, watering it carefully; for if allowed to dry, it is much damaged. This is done always in the morning; as it cannot be done at, night in regard of

the hot quality of the lime, which soon heats the cloth, and tenders it. If a hot sun-shine follows, it has great effect; for lime is just like all other materials for bleaching, that have more or less effect according as the weather is good or bad. I take it up the second day after bucking, and give it a little milling, or hand-rubbing, or bittling, commonly called *knocking*; and lay it on the field again, watering it carefully as before. The effect is more visible the second than the first day. As all cloth when limed should have a great deal of work, otherwise more than half the effect is lost; and not only that, but a great deal of labour and pains is requisite to take the lime out of the cloth again; it must never be exposed on the Sabbath day, but carefully kept wet always while used in this way. Thus bucking for three or four times at most, is sufficient for any cloth, except that made of flax pulled either over-green, or which grows in a droughty season, or perhaps not so well heckled as it should be. This sort occasions great trouble and expence to the bleacher. But the most effectual and expeditious way I ever found for this kind, was, after boiling, to take a little of the warm lye, and mix a very small quantity of lime with it, and draw the cloth through that as hot as possible, and put it on the field directly, watering it carefully. This will clean it of the *sprat* surprisingly. Then I boil it with pearl ashes, and give it the last boil with soap.

“There are innumerable mistakes in the use of lime committed by the vulgar, who are ignorant of its quality and effects. They know only this in general, that it is a thing which whitens cloth cheap, and is easy purchased; therefore they will use it. Some of them begin whitening of their cloth with it, which I have already observed to be wrong, and given reasons for it, and continue it until the cloth is bleached; give it a boil or two at most, and then wash it up while the gross body of the lime is in the substance of the cloth. This makes limed cloth easily distinguishable from unlimed, as the former has a yellowish colour, and is full of a powder. Besides, as lime is of a very hot corroding nature, it must by degrees weaken the cloth. The bad effects of this substance do not end here. When the cloth is put on board, it contracts a dampness, which not only makes it yellow, and lose any thing of colour it has, but directly rots it. And although it should escape this, which it is possible it may, by a quick and speedy passage; yet whenever it is put in any warehouse, it will meet with moisture there, especially if the winter-season should come on before it is disposed or made use of. These I take to be the principal reasons for so much complaint in bleaching with this material.”

The whole art and safety in using the lime, according to this method, depends on the junction of the alkaline salts, during the bucking, to the particles of lime which were on the surface of the cloth.

B L E

BLEAK, in ornithology. See *CYPRINUS*.

BLECHINGLY, a town of Surry in England, which sends two members to parliament, and the bailiff who returns the members, is chosen annually at the lord of the manor's court. The town stands on a hill, and has a fine prospect as far as the South Downs in Suffex.

B L E

W. Long. o. 15. N. Lat. 51. 20.

BLEEDING, in therapeutics; see the *Index* subjoined to *MEDICINE*. As a chirurgical operation, see *SURGERY*, chap. i.

BLEEDING at the Nose, called *Epistaxis*. See the *Index* subjoined to *MEDICINE*.

BLEED-

BLEEDING, in *Parriery*. See there, § ii. 1.

BLEEDING, is also used for a hæmorrhage or flux of blood from a wound, rupture of a vessel, or other accident. See HÆMORRHAGE.

BLEEDING of a *Corps*, is a phenomenon said to have frequently happened in the bodies of persons murdered, which, on the touch, or even the approach, of the murderer, began to bleed at the nose, ears, and other parts; so as formerly to be admitted in England, and still allowed in some other parts, as a sort of detection of the criminal, and proof of the fact. Numerous instances of these posthumous hæmorrhages are given by writers. But this kind of evidence ought to be of small weight: for it is to be observed, that this bleeding does not ordinarily happen, even in the presence of the murderer; yet sometimes in that even of the nearest friends, or persons most innocent; and sometimes without the presence of any, either friend or foe. In effect, where is the impossibility that a body, especially if full of blood, upon the approach of external heat, having been considerably stirred or moved, and a putrefaction coming on, some of the blood-vessels should burst, as it is certain they all will in time? *

BLEEDING is also used for the drawing out the sap of plants, otherwise called *tapping*. See TAPPING.

BLEIKING, a territory in the south part of Sweden, having the Baltic Sea on the south, Smaland on the north, and the province of Schonon on the west. Its principal towns are Christianstad, Elleholm, A-huys, Roterby, and Christianople, which last is the capital.

BLEMYES, or BLEMMEYES, a fabulous people of Ethiopia, said to have had no heads; their eyes, mouth, &c. being situated in their breasts †.

BLENCH, or BLANCH. See BLANCH.

BLEND, or BLENDE, a mineral substance resembling lead-ore, but containing very little of that metal.

BLEND-Water, called also *marebough*, a distemper incident to black cattle, comes either from the blood, from the yellows, or from the change of ground.—In order to cure it, take bole armoniac, and as much charcoal dust as will fill an egg-shell, a good quantity of the inner bark of an oak, dried and pounded together to a powder, and give it to the beast in a quart of new milk and a pint of earning.

BLENHEIM, a village of Germany, in the circle of Susbia, situated in E. Long. 2. 30. N. Lat. 48. 40. This village is remarkable for the defeat of the French and Bavarians in 1704, by the English and their confederates under prince Eugene and the duke of Marlborough. In this engagement the French army consisted of 82 battalions and 160 squadrons, while that of the confederates did not exceed 64 battalions and 152 squadrons. The right wing of the French army was commanded by Monsr. Tallard; the elector, and count Marín, were on the left. Tallard was esteemed an active, penetrating officer, and a man of genius; Marín's merit consisted rather in his experience and application, than in his resources from the efforts of genius. In the village of Blenheim were posted 20 battalions and 12 squadrons, from a presumption that there the confederates would make their chief attack. Accordingly, at noon, the village was furiously attacked by a body of English supported by another of Hessians; but the French behaved with such bravery, that they re-

pulsed their enemies in three successive attempts. Part of the centre and right wing of the confederates then advanced; but were so vigorously opposed by the French horse, and so miserably galled in the flank by the troops posted in the village of Blenheim, that they were obliged to retreat with precipitation: but in the mean time the French cavalry, being attacked by the left wing of the confederates, were forced to retreat in their turn, though commanded by Tallard in person, who rallied them three times. The infantry were disordered by the falling back of the cavalry; and being unsupported, gave way to the vigorous efforts of their enemies. Marlborough pushed between the battalions placed in Blenheim and the wing of the army commanded by Tallard; and thus the army was separated and almost surrounded; for prince Eugene had succeeded in his fourth attempt, and driven the French and Bavarians out of the village. All was now in confusion; and Tallard, being short-sighted, mistook a squadron of the enemy for his own, and was taken prisoner. The troops who had been posted in the village being driven out by prince Eugene, and then finding it impossible to escape, being hemmed in on the other side by the duke of Marlborough, were forced to surrender prisoners of war, while the rest of the army fled in the utmost confusion and consternation. Vast numbers threw themselves into the Danube, inasmuch that in that river the greater part of 30 squadrons perished. Ten thousand were left dead on the field; 13,000 made prisoners; 100 pieces of cannon, 22 mortars, and upwards of 100 pair of colours, were taken; besides near 200 standards, 17 pair of kettle-drums, upwards of 3000 tents, 34 coaches, 300 loaded mules, two bridges of boats, and all the French baggage, with their military chest. This was the most terrible defeat the French had for a long time sustained: Monsr. Tallard was blamed for detaching so many troops to Blenheim, in consequence of which Marlborough pierced the centre, and divided the army in two; also for suffering the confederates to pass a rivulet, and form quietly on the other side. These accusations, however, seem but weakly founded; and the victory is undoubtedly to be ascribed to the superior valour of the confederate troops and genius of their commanders, rather than to any material blunders of the French generals.

BLENHEIM-HOUSE, a noble and princely house erected in honour of the duke of Marlborough at Woodstock near Oxford, which with the manor of Woodstock is settled on the duke and his heirs, in consideration of the eminent services by him performed for the public; and for building of which house the sum of L. 500,000 was granted by parliament, &c.

BLENNIUS, in ichthyology, a genus of fishes belonging to the order of jugulares; the characters of which are these: The head slants or declines to one side; there are six rays in the membrane of the gills; the body tapers towards the tail; the belly-fins have only two blunt bones; and the tail-fin is distinct. The species are 13, viz. 1. The galeria, with a transverse membranous crest upon the head. It is found in the European seas. 2. The cristatus, with a longitudinal bristly crest betwixt the eyes. 3. The cornutus, with a simple ray above the eyes, and a single back-fin. The above two are natives of the Indies. 4. The ocellaris, with a furrow betwixt the eyes, and a large spot on the back.

Blenheim,
Blennius.

back-fin. 5. The gattorugine, with small palmated fins about the eye-brows and neck. It is about seven or eight inches long. These two last are found in the European seas. 6. The superciliosus, with small fins about the eye-brows, and a curved lateral line. It is a native of India. 7. The phycis, with a kind of crested nostrils, a cirrus or beard on the under lip, and a double fin on the back. It has seven rays in the gill-membrane; the anus is surrounded with a black ring; and the tail is roundish. 8. The pholis has a smooth head, a curve line upon the sides, and the upper jaw is larger than the under one. The two last are found in the Mediterranean sea. 9. The gunellus has 10 black spots on the back-fin. It is found in the Atlantic ocean. 10. The mustelaris has three rays on the fore-part of the back-fin. It is a native of India. 11. The viviparus has two tentacula at the mouth. Schoneveldt first discovered this species; Sir Robert Sibbald afterwards found it on the Scotch coast. They bring forth two or three hundred young at a time. Their season of parturition is a little after the depth of winter. Before midsummer, they quit the bays and shores; and retire into the deep, where they are commonly taken. They are a very coarse fish, and eaten only by the poor. They are common in the mouth of the river Elbe, at Whitby, Yorkshire; where they are taken frequently from off the bridge. They sometimes grow to the length of a foot. Their form is slender, and the backbone is green, as that of a sea-needle. 12. The lumpenus has several dusky-coloured areolæ running across its body. The two last are found in the European seas. 13. The raiunus, with six divisions in the belly-fins, is found in the lakes of Sweden. It is remarkable, that when this fish appears in the lake, all the other fishes retire; and what is worse, it is not fit for eating.

BLENNY. See the above article.

BLIGHT, in husbandry, a disease incident to plants, which affects them variously, the whole plant sometimes perishing by it, and sometimes only the leaves and blossoms, which will be scorched and shrivelled up, the rest remaining green and flourishing.

Some have supposed that blights are usually produced by an easterly wind, which brings vast quantities of insect eggs along with it, from some distant place, that, being lodged upon the surface of the leaves and flowers of fruit trees, cause them to shrivel up and perish.

To cure this distemper, they advise the burning of wet litter on the windward side of the plants, that the smoke thereof may be carried to them by the wind, which they suppose will stifle and destroy the insects, and thereby cure the distemper.

Others direct the use of tobacco-dust, or to wash the trees with water wherein tobacco-stalks have been infused for 12 hours; which they say will destroy those insects, and recover the plants.

Pepper-dust scattered over the blossoms of fruit-trees, &c. has been recommended as very useful in this case; and there are some that advise the pulling off the leaves that are distempered.

The true cause of blights seem to be continued dry easterly winds for several days together, without the intervention of showers, or any morning dew, by which the perspiration in the tender blossom is stopped; and if it so happens, that there is a long continuance of the

same weather, it equally affects the tender leaves, whereby their colour is changed, and they wither and decay.

The best remedy for this distemper, is gently to wash and sprinkle over the tree, &c. from time to time with common water; and if the young shoots seem to be much infected, let them be washed with a woollen cloth, so as to clear them, if possible, from this glutinous matter, that their respiration and perspiration may not be obstructed. This operation ought to be performed early in the day, that the moisture may be exhale before the cold of the night comes on: nor should it be done when the sun shines very hot.

Another cause of blights in the spring, is sharp hoary frosts, which are often succeeded by hot sunshine in the day-time: this is the most sudden and certain destroyer of the fruits that is known.

BLIGHTED-Corn. See SMUT.

BLIND, an epithet applied to a person or sensitive creature deprived of the use of his eyes; or, in other words, to one from whom light, colours, and all the glorious variety of the visible creation, are intercepted by some natural or accidental disease. Such is the literal acceptance of the term: but it is likewise used in a metaphorical sense, to signify mental or intellectual darkness; and frequently implies, at the same time, some moral or spiritual depravity in the soul thus blinded, which is either the efficient or continuing cause of this internal malady. Yet, even in metaphor, the epithet of *blind* is sometimes applied to a kind of ignorance, which neither involves the ideas of real guilt, nor of voluntary error. It is, however, our present intention to consider the word, not in its figurative, but in its natural and primary sense. Nor do we mean in this place to regard it as a subject of medical speculation, or to explore its causes and enumerate its cures. These are in the department of another science. It is rather our design to consider, By what means this inexpressible misfortune may be compensated or alleviated to those who sustain it; what advantages and consolations they may derive from it; of what acquisitions they may be susceptible; what are the proper means of their improvement; or by what culture they may become useful to themselves, and important members of society.

There is not, perhaps, any sense or faculty of the corporeal frame, which affords so many resources of utility and entertainment, as the power of vision; nor is there any loss or privation which can be productive of disadvantages or calamities so multiform, so various, and so bitter, as the want of sight. By no avenue of corporeal perception is knowledge in her full extent, and in all her forms, so accessible to the rational and inquiring soul, as by the glorious and delightful medium of light. For this not only reveals external things in all their beauties, in all their changes, and in all their varieties; but gives body, form, and colour, to intellectual ideas and abstract essences; so that the whole material and intelligent creation lie in open prospect, and the majestic frame of nature in its whole extent, is, if we may speak so, perceived at a single glance. To the blind, on the contrary, the visible universe is totally annihilated; he is perfectly conscious of no space but that in which he stands, or to which his extremities can reach. Sound, indeed, gives him some ideas of distant objects;

objects; but those ideas are extremely obscure and indistinct. They are obscure, because they consist alone of the objects whose oscillations vibrate on his ear, and do not necessarily suppose any other bodies with which the intermediate space may be occupied, except that which gives the sound alone: they are indistinct, because sounds themselves are frequently ambiguous, and do not uniformly and exclusively indicate their real causes. And though by them the idea of distance in general, or even of some particular distances, may be obtained; yet they never fill the mind with those vast and exalting ideas of extension which are inspired by ocular perception. For though a clap of thunder, or an explosion of ordnance, may be distinctly heard after they have traversed an immense region of space; yet, when the distance is uncommonly great, it ceases to be indicated by sound; and therefore the ideas, acquired by auricular experiment of extension and interval, are extremely confused and inadequate. The living and comprehensive eye darts its instantaneous view over expansive valleys, lofty mountains, protracted rivers, illimitable oceans. It measures, in an indivisible point of time, the mighty space from earth to heaven, or from one star to another. By the assistance of telescopes, its horizon is almost indefinitely extended, its objects prodigiously multiplied, and the sphere of its observation nobly enlarged. By these means, the imagination, injured to vast impressions of distance, can not only recal them in their greatest extent with as much rapidity as they were at first imbibed; but can multiply them, and add one to another, till all particular boundaries and distances be lost in immensity. Thus nature, by profusely irradiating the face of things, and clothing objects in a robe of diversified splendour, not only invites the understanding to expatiate on a theatre so extensive, so diversified, and so attractive; but entertains and inflames the imagination with every possible exhibition of the sublime or beautiful. The man of light and colours beholds the objects of his attention and curiosity from far. Taught by experience, he measures their relative distances; distinguishes their qualities; determines the situations, positions, and attitudes; presages what these tokens may import; selects his favourites; traverses in security the space which divides them from him; stops at the point where they are placed; and either obtains them with ease, or immediately perceives the means by which the obstacles that intercept his passage to them may be surmounted. The blind not only may be, but really are, during a considerable period, apprehensive of danger in every motion towards any place from whence their contracted powers of perception can give them no intelligence. All the various modes of delicate proportion, all the beautiful varieties of light and colours, whether exhibited in the works of nature or art, are to them irretrievably lost. Dependent for every thing, but mere subsistence, on the good offices of others; obnoxious to injury from every point, which they are neither capacitated to perceive, nor qualified to resist; they are, during the present state of being, rather to be considered as prisoners at large, than citizens of nature. The sedentary life, to which by privation of light they are declined, relaxes their frame, and subjects them to all the disagreeable sensations which arise from dejection of spirits. Hence the most feeble exertions create lassitude and uneasiness. Hence

the native tone of the nervous system, which alone is compatible with health and pleasure, destroyed by inactivity, exasperates and embitters every disagreeable impression. Natural evils, however, are always supportable; they not only arise from blind and undesigned causes, but are either mild in their attacks, or short in their duration: it is the miseries which are inflicted by conscious and reflecting agents alone, that can deserve the name of evils. These excruciate the soul with ineffable poignancy, as expressive of indifference or malignity in those by whom such bitter potions are cruelly administered. The negligence or wantonness, therefore, with which the blind are too frequently treated, is an enormity which God alone has justice to feel or power to punish.

Those amongst them who have had sensibility to feel, and capacity to express, the effects of their misfortunes, have described them in a manner capable of penetrating the most callous heart. The venerable father of epic poetry, who in the person of Demodocus the Phæzian bard is said to have described his own situation, proceeds thus:

Τὸν γὰρ Μῦσ' ἐπέειπε, δίδου δ' αὐτὸν γέ, κακὸν γὰρ
Ὀφθαλμοῖν μὲν αἰσέει, ἴδου δ' ὀπίσσω αἰσέει. O D Y S. 6.
Dear to the muse, who gave his days to flow
With mighty blessings mix'd with mighty woe,
In clouds and darkness quench'd his visual ray,
Yet gave him power to raise the lofty lay. P O P E.

Milton, in his address to light, after a sublime description of his arduous and gloomy journey from the regions of primeval darkness to this our visible diurnal sphere, thus continues to apostrophise the celestial beam:

Taught by the heav'nly muse to venture down
The dark descent, and up to reascend,
Though hard and rare; thee I revisit oft,
And feel thy sov'reign vital lamp: but thou
Revisit'st not these eyes, that roll in vain
To find thy piercing ray, and find no dawn;
So thick a drop serene hath quench'd their orbs,
Or dim insulion veild. Yet not the more
Cease I to wander, where the muses haunt
Clear spring, or shady grove, or sunny hill,
Smit with the love of sacred song: but chief
Thee, Sion, and the flow'ry brooks beneath,
That wash thy hallow'd feet, and warbling flow,
Nightly I visit; nor sometimes forget
Those other two equall'd with me in fate,
So were I equall'd with them in renown,
Blind Thamyris, and blind Mæonides,
And Tereus and Phineus prophets old:
Then feed on thoughts, that voluntary move
Harmonious numbers; as the wakeful bird
Sings dawning, in the shadeless covert hid
Tunes her nocturnal note. Thus with the year
Seasons return; but not to me returns
Day, or the sweet approach of ev'n or morn,
Or light of vernal bloom, or summer's rose,
Or hocks, or herds, or human face divine;
But cloud instead, and ever-during dark,
Surrounds me, from the cheerful ways of men
Cut off, and for the book of knowledge fair
Presented with a universal blank,
Of nature's works to me expung'd and ras'd,
And wisdom at one entrance quite shut out.

PAR. LOST, Book III.

The same inimitable author, in his tragedy of Sampson Agonistes, and in the person of his hero, deploras the misfortune of blindness with a pathos and energy sufficient to extort the deepest sighs from the most unfeeling hearts: c

Blind.

The situation of the blind described by poets.

6
Homer.

7
Milton.

—But chief of all,
 O loss of sight, of thee I must complain!
 Blind among enemies, O worse than chains,
 Dungeon, or beggary, decrepid age,
 Light, the prime work of God, to me is extinct,
 And all her various objects of delight
 Annul'd, which might in part my grief have eas'd,
 Inferior to the vilest now become
 Of man or worm. The vilest here excel me:
 'They creep, yet see; I dark in light expos'd
 To daily fraud, contempt, abuse, and wrong,
 Within doors, or without, still as a fool,
 In power of others, never in my own;
 Scarce half I seem to live, dead more than half.
 O dark, dark, dark, amid the blaze of noon,
 Irrecoverably dark, total eclipse
 Without all hope of day!
 O first-created Being, and thou great Word,
 Let there be light, and light was over all;
 Why am I thus bereav'd thy prime decree?
 'The sun to me is dark,
 And silent, as the moon
 When she defects the night,
 Hid in her vacant intellinour cave.
 Since light so necessary is to life,
 And almost life itself, if it be true
 That light is in the soul,
 She all in every part; why was the sight
 To such a tender ball as th' eye confin'd?
 So obvious, and so easy to be quench'd?
 And not, as feeling, throughout all parts diffus'd,
 That the might look at will through ev'ry pore?
 'Then had I not been thus exil'd from light,
 As in the land of darkness, yet in light
 To live a life half dead, a living death;
 And bury'd; but yet more miserable!
 Myself the sepulchre, a moving grave;
 Bury'd, yet not exempt
 By privilege of death and burial
 From worst of other evils, pains and wrongs,
 But made hereby obnoxious more
 To all the miseries of life.

Osian, the Caledonian bard, who lived before the authenticated history of his nation dates its origin, who in his old age participated the same calamity, has in more than one passage of his works described his situation in a manner so delicate, yet so pathetic, that it pierces the inmost recesses and excites the finest feelings of the heart. Of these passages, take the following:

“ O thou that rollest above, round as the shield of my fathers! whence are thy beams, O sun! whence thy everlasting light? Thou comest forth in thy awful beauty, and the stars hide themselves in the sky; the moon, cold and pale, sinks in the western wave. But thou thyself movest alone: who can be a companion of thy course? The oaks of the mountains fall; the mountains themselves decay with years; the ocean shrinks and grows again; the moon herself is lost in heaven: but thou art for ever the same; rejoicing in the brightness of thy course. When the world is dark with tempests; when thunder rolls and lightning glances through the heavens; thou lookest in thy beauty from the clouds, and laughest at the storm. But to Osian thou lookest in vain: for he beholds thy beams no more; whether thy yellow hair flows on the eastern clouds, or thou tremblest at the gates of the west. But thou art, perhaps, like me, for a season; and thy years will have an end: thou shalt sleep in thy clouds, careless of the voice of the morning.—Exult then, O sun, in the strength of thy youth! age is dark and unlovely; it is like the glimmering light of the moon, when it shines through broken clouds, and the mist is on the hills, the howling blast of the north is on the plain,

the traveller shrinks in the midst of his journey.”

Thus dependent on every creature, and passive to every accident, can the world, the uncharitable world, be surpris'd to observe moments when the *blind* are at variance with themselves and every thing else around them? With the same instincts of self-preservation, the same irascible passions which are common to the species, and exasperated by a sense of debility either for retaliation or defence; can the blind be real objects of resentment or contempt, even when they seem peevish or vindictive? This, however, is not always their character. Their behaviour is often highly expressive, not only of resignation, but even of cheerfulness; and tho' they are often coldly, and even inhumanly, treated by men, yet are they rarely, if ever, forsaken of heaven. The common Parent of nature, whose benignity is permanent as his existence and boundless as his empire, has neither left his afflicted creatures without consolation nor resource. Even from their loss, however oppressive and irrevocable, they derive advantages; and indeed adequate to recompense, but sufficient to alleviate, their misery. The attention of the soul, confined to these avenues of perception which she can command, is neither dissipated nor confounded by the immense multiplicity nor the rapid succession of surrounding objects. Hence her contemplations are more uniformly fixed upon herself, and the revolutions of her own internal frame. Hence her perceptions of such external things as are contiguous and obvious to her observation become more lively and exquisite. Hence even her instruments of corporeal sensation are more assiduously cultivated and improved, so that from them she derives such notices and presages of approaching pleasure or impending danger as entirely escape the attention of those who depend for security on the reports of their eyes. A blind man, when walking swiftly, or running, is kindly and effectually checked by nature from rudely encountering such hard and extended objects as might hurt or bruise him. When he approaches bodies of this kind, he feels the atmosphere more sensibly resist his progress; and in proportion as his motion is accelerated, or his distance from the object diminished, the resistance is increased. He distinguishes the approach of his friend from far by the sound of his steps, by his manner of breathing, and almost by every audible token which he can exhibit. Prepared for the dangers which he may encounter from the surface of the ground upon which he walks, his step is habitually firm and cautious. Hence he not only avoids those falls which might be occasioned by its less formidable inequalities, but from its general bias he collects some ideas how far his safety is immediately concerned; and though these conjectures may be sometimes fallacious, yet they are generally so true, as to preserve him from such accidents as are not incurred by his own temerity. The rapid torrent and the deep cascade not only warn him to keep a proper distance, but inform him in what direction he moves, and are a kind of audible synofures to regulate his course. In places to which he has been accustomed, he as it were recognises his latitude and longitude from every breath of varied fragrance that tinges the gale, from every ascent or declivity in the road, from every natural or artificial sound that strikes his ear; if these indications be stationary, and confined to particular places.

Regu-

Regulated by these signs, the *blind* have not only been known to perform long journeys themselves, but to conduct others through dangerous paths at the dark and silent hour of midnight, with the utmost security and exactness (A).

It were endless to recapitulate the various mechanical operations of which they are capable, by their nicety and accuracy of touch. In some the tactile powers are said to have been so highly improved, as to perceive that texture and disposition of coloured surfaces by which some rays of light are reflected and others absorbed, and in this manner to distinguish colours. But the testimonies for this fact still appear to us too vague and general to deserve public credit. We have known a person who lost the use of his sight at an early period of infancy, who in the vivacity or delicacy of his sensations was not perhaps inferior to any one, and who had often heard of others in his own situation capable of distinguishing colours by touch with the utmost exactness and promptitude. Stimulated, therefore, partly by curiosity to acquire a new train of ideas, if that acquisition were possible; but still more by incredulity with respect to the facts related; he tried repeated experiments by touching the surfaces of different bodies, and examining whether any such diversities could be found in them as might enable him to distinguish colours; but no such diversity could he ever ascertain. Sometimes, indeed, he imagined that objects which had no colour, or (in other words) such as were black, were somewhat different and peculiar in their surfaces; but this experiment did not always nor universally hold. His scepticism therefore still continues to prevail (a). That their acoustic perceptions are distinct and accurate, we may fairly conclude from the rapidity with which they ascertain the acuteness or gravity of different tones, as relative one to another; and from their exact discernment of the various kinds and modifications of sound, and of sonorous objects, if the sounds themselves be in any degree significant of their causes. From this vivacity and accuracy of external sensation, and from the assiduous and vigorous applications of a comprehensive and attentive mind, alone, we are able to account for the rapid and astonishing progress which some of them have made, not only in those departments of literature which were most obvious to their senses and accessible to their understandings, but even in the abstractest, and (if we may be allowed the expression) in the most occult, sciences. What, for instance, can be more remote from the conceptions of a blind man than the abstract relations and properties of space and quantity? yet the incomprehensible attainments of Mr Saunderson in all the branches of mathematics are now fully known and firmly believed by the whole literary world, both from the testimony of his pupils and the publication of his works. But should the fact be still uncertain, it might be sufficiently verified by a living prodigy (c) of this kind, with which our country is at present honoured. The gentleman of whom we now speak, though blind from his infancy, by the ardour and assiduity of his ap-

plication, and by the force of a genius to which nothing is impetrable, has not only made incredible advances in mechanical operations, in music, and in the languages; but is likewise profoundly skilled in geometry, in optics, in algebra, in astronomy, in chemistry, and in all the other branches of natural philosophy as taught by Newton and received by an admiring world. We are sorry that neither the modesty of this amiable philosopher, nor the limits of this article, will permit us to delineate his character in its full proportions. All we can do is to exhibit his example, that by it the vulgar prejudice, which presumes to think blindness and learning incompatible, may be dissipated; and that an instance of success so noble and recent may inflame the emulation and encourage the efforts of such as have genius and opportunity to pursue the same laudable path. If these glorious attempts should neither be perceived nor rewarded by an unfeeling world, if human nature should forget to recognize its own excellence so nobly displayed in instances of this kind; yet, besides the enjoyments resulting from a sublime and comprehensive understanding, besides the immortal and inexhaustible sources of delight which are the peculiar portion of a self-approving mind, these happy pupils and favourites of nature are, as it were, indulged with her personal intercourse. They become more intimately acquainted with her laws, till, by exploring the beneficence of her economy, the sublimity of her ends, the regularity of her procedure, and the beauties of her frame, they imbibe the spirit, and feel the presence, of her glorious Author:

ly swift degrades the love of nature works,
And warms the bosom; till at last, sublim'd
To rapture and enthusiastic heat,
We feel the present deity, and taste
The joys of God to see a happy world. THOMSON.

Much labour has been bestowed to investigate, both from reason *a priori*, and from experiment, what might be the primary effects of light and luminous objects upon such as have been born blind, or early deprived of sight, if at a maturer period they should instantaneously recover their visual powers. But upon this topic there is much reason to fear, that nothing satisfactory has yet been said. The fallacy of hypothesis and conjecture, when formed *a priori* with respect to any organ of corporeal sensation and its proper object, is too obvious to demand illustration. But from the nature of the eye, and the mediums of its perception, to attempt an investigation of the various and multiform phenomena of vision, or even of the varieties of which every particular phenomenon is susceptible according as the circumstances of its appearance are diversified, would be a project worthy of philosophy in a delirium. Nay, even the discoveries which are said to accrue from experiment, may still be held as extremely doubtful and suspicious; because, in these experiments, it does not appear to have been ascertained, that the organs to which visible objects were presented immediately after surgical operations, could be in a proper state to perceive them. Yet, after all, it is extremely probable, that figure, distance, and magnitude, are not immediate objects of ocular sensation, but acquired and adjusted

23
Accounts of
the effects of
recovered
sight upon
those who
have been
born blind,
uncertain.

(A) We have read, in authors of good credit, of a very surprising blind guide who used to conduct the merchants through the sands and deserts of Arabia. Vide *Leo Afric. Descr. Afr. lib. vi. p. 246.* and *Casaub. Treat. mer. Enthuf. c. ii. p. 45.*

(a) See, however, the extraordinary case subjoined to this article.

(c) Mr Henry Moyes, at present residing near Kirkaldy.

Blind.

by long and reiterated experience (D). There are, however, many deliderata, which the perceptions of a man born blind might considerably illustrate, if his instruments of vision were in a right state, and assisted by a proper medium. Such a person might perhaps give a clearer account, why objects, whose pictures are inverted upon the retina of the eye, should appear to the mind in their real positions; or why, though each particular object is painted upon the retina of both our eyes, it should only be perceived as single. Perhaps, too, this new spectator of visible nature might equally amuse our curiosity and improve our theory, by attempting to describe his earliest sensations of colour, and its original effects upon his organ and his fancy. But, as we have already hinted, it is far from being certain, that trials of this kind have ever been fairly made. Such readers as may wish to see a more minute detail of these questions, may consult Mr Diderot's *Lettre sur les aveugles, a l'usage de ceux qui voyent*: "A letter concerning the blind for the use of those who see." To these may be added, Mr Cheselden's *Anatomy*, and Locke's *essay on the human understanding*.

When we ruminate on the numberless advantages derived from the use of sight, and its immense importance, in extending the human capacity, or in improving and cultivating every faculty and every function of the mind, we might be strongly tempted to doubt the fidelity of those reports which we have heard, concerning such persons as, without the assistance of light, have arrived at high degrees of eminence even in those sciences which appear absolutely unattainable but by the interposition of external mediums. It has, however, been demonstrated by a late ingenious author, that blind men, by proper instruction, are susceptible almost of every idea and of every truth which can be impressed on the mind by the mediation of light and colours, except the sensations of light and colours themselves †.

Yet there is one phenomenon of this kind which seems to have escaped the attention of that great philosopher, and for which no author either of this or any former period has been able to offer any tolerable account. Still, however, it seems to merit the attention of a philosopher. For though we should admit, that the blind can understand with great perspicacity all the phenomena of light and colours; though it were allowed, that in these subjects they might extend their speculations beyond their instructions, and investigate the mechanical principles of optics by the mere force of genius and application, from the data which they had already obtained; yet it will be difficult, if not impossible, to assign any reason why these objects should be more interesting to a blind man, than any other abstract truths whatever. It is possible for the blind, by a retentive memory, to tell you, That the sky is an azure; that the sun, moon, and stars, are bright; that the rose is red, the lily white or yellow, and the tulip variegated. By continually hearing these substantives and adjectives joined, he may be mechanically taught to join them in the same manner; but, as he never had any sensation

of colour, however accurately he may speak of coloured objects, his language must be like that of a parrot; without meaning, or without ideas. Homer, Milton, and Ossian, had been long acquainted with the visible world before they were surrounded with clouds and ever-during darkness. They might, therefore, still retain the warm and pleasing impressions of what they had seen. Their descriptions might be animated with all the rapture and enthusiasm which originally fired their bosoms when the grand or delightful objects which they delineated were immediately beheld. Nay, that enthusiasm might still be heightened by a bitter sense of their loss, and by that regret which a situation so dismal might naturally inspire. But how shall we account for the same energy, the same transport of description, exhibited by those on whose minds visible objects were either never impressed, or have been entirely obliterated. Yet, however unaccountable this fact may appear, it is no less certain than extraordinary. But delicacy and other particular circumstances forbid us to enter into this disquisition with that minuteness and precision which it requires. We only mention the fact as one amongst the few resources for entertainment, and avenues to reputation, which are still reserved for the blind. Whoever thinks the subject of sufficient consequence to merit a nicer scrutiny, may consult the *Preface to Blacklock's Poems*, written by G. G. Esq. and printed at Edinburgh 1754; or the account of his life and writings by the Rev^d Mr Spence, prefixed to a quarto edition of his poems published at London in 1756.

It is hoped, however, that we shall not be suspected of partiality for inserting a character of the same author by one who was a foreigner, a stranger to his person, and prepossessed in his favour by his works alone.

"Blacklock will appear to posterity a fabulous character: even now he is a prodigy. It will be thought a fiction and a paradox, that a man quite blind since he was three years old (†), besides having made himself so good a master of various languages, of Greek, Latin, Italian, and French, should also be a great poet in his own; and, without hardly ever having seen the light, should be so remarkably happy in description †."

It is impossible to enter into a detail of particulars with respect to the education of the blind. These must be left to be determined by the genius, the capacity, the circumstances, of those to whom the general rules which may be given should be applied. Much therefore must depend on their fortunes, much on their temper and genius; for, unless these particulars were known, every answer which could be given to questions of this kind must be extremely general, and of consequence extremely superficial. Besides, the task is so much more arduous, because whoever attempts it can expect to derive no assistance from those who have written on education before him: And though the blind have excelled in more than one science; yet, except in the case of Sannderfon, professor of mathematics in the university of Cambridge, concerning whom we shall afterwards have occasion to speak, it does not appear, that any of them have been conducted to that degree

† Cor.
nino, l.
3 de li-
teraturæ
chap.

Of the
cation
blind.

(D) The gentleman couched by Mr Cheselden, had no idea of distance; but thought that all the objects he saw, touched his eyes, as what he felt did his skin. It was also a considerable time before he could remember which was the cat, and which the dog, though often informed, without first feeling them.

(E) The author is here mistaken: Dr Blacklock only saw the light for five months.

Diderot's
Works,
Vol. II.

† See Dr
Keid's Inqui-
ry into the
Human
Mind,
chap. vi.
§ 1, 2.

14.
How the
blind catch
the enthusi-
asm inspired
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of eminence, at which they arrived, upon a premeditated plan. One should rather imagine, that they have been led through the general course and ordinary forms of discipline; and that, if any circumstances were favourable to their genius, they rather proceeded from accident than design.

This fact, if not supported by irrefragable evidence, should, for the honour of human nature, have been suppressed. When contemplated by a man of benevolence and understanding, it is not easy to guess whether his mortification or astonishment would be most sensibly felt. If a heart that glows with real philanthropy must feel for the whole vital creation, and become, in some measure, the *sensorium* of every suffering insect or reptile; how must our sympathy increase in tenderness and force, when the distressed individuals of our own species become its objects? Nor do the blind bear so small a proportion to the whole community, as, even in a political view, to be neglected. But in this, as in every other political crime, the punishment returns upon the society in which it is committed. Those abandoned and unimproved beings, who, under the influence of proper culture and discipline, might have successfully concurred in producing and augmenting the general welfare, become the nuisances and burdens of those very societies who have neglected them.

There is perhaps no rank of beings in the sensible universe, who have suffered from nature or accident, more meritorious of public compassion, or better qualified to repay its generous exertions, than the blind. They are meritorious of compassion; for their sphere of action and observation is infinitely more limited than that of the deaf, the lame, or of those who labour under any other corporeal infirmity consistent with health. They are better qualified to repay any friendly interposition for their happiness; because, free from the distraction which attends that multiplicity of objects and pursuits that are continually obvious to the sight, they are more attentive to their own internal economy, to the particular notices of good and evil impressed on their hearts, and to that peculiar province in which they are circumscribed by the nature and cultivation of their powers.

It will easily occur to the reader, that, if the pupil should not be placed in easy circumstances, music is his readiest and most probable resource. Civil and ecclesiastical employments have either something in their own nature, or in the invincible prejudices of mankind, which renders them almost entirely inaccessible to those who have lost the use of sight. No liberal and cultivated mind can entertain the least hesitation in concluding, that there is nothing, either in the nature of things, or even in the positive institutions of genuine religion, repugnant to the idea of a blind clergyman. But the novelty of the phenomenon, while it astonishes vulgar and contracted understandings, inflames their zeal to rage and madness. Besides, the adventitious trappings and ceremonies assumed by some churches as the drapery of religion, would, according to these systems, render the sacerdotal office painful, if not impracticable, to the blind.

We have, some years ago, read of a blind gentleman*, descended from the same family with the celebrated lord Verulam, who, in the city of Brussels, was with high approbation created doctor of laws; since that period

we have been honoured with his correspondence. He was deprived of sight at nine years of age by an arrow from a cross-bow whilst he was attempting to shoot it. When he had recovered his health, which had suffered by the shock, he pursued the same plan of education in which he had been engaged; and having heard that one Nicasius de Vourde, born blind, who lived towards the end of the 15th century, after having distinguished himself by his studies in the university of Lovain, took his degree as doctor of divinity in the university of Cologne; this motive prevailed with him to make the same attempt. But the public, cursed with prejudices for which the meanest sensitive nature might blush, prejudices equally beneath the brutality and ignorance of the lowest animal-instinct, treated his intention with ridicule: even the professors were not far from being of that sentiment; and they admitted him into their schools, rather from an impression that it might amuse him, than become of any use to him. He had the good fortune, however, contrary to their expectations, to obtain the first places amongst his condisciples. It was then said, that such rapid advances might be made in the preliminary branches of his education; but would soon be effectually checked by studies of a more profound and abstracted nature. This, it seems, was repeated from school to school, through the whole climax of his pursuits; and when, in the course of academical learning, it became necessary to study poetry, it was the general voice that all was over, and that at length he had reached his *ne plus ultra*. But here he likewise confronted their prepossessions, and taught them the immense difference between blindness of body and blindness of soul. After continuing his studies in learning and philosophy for two years more, he applied himself to law, took his degree in that science, commenced pleading counsel^{or} or *advocate* in the council of Brabant, and has had the pleasure of terminating almost every suit in which he has been engaged to the satisfaction of his clients.

Had it not been for a fact so striking and so well authenticated, though there could have been no doubt that a blind man might discharge the office of a chamber-counsellor with success; yet, as a barrister, his difficulties must have appeared more formidable, if not absolutely insuperable. For he should remember all the sources, whether in natural equity or positive institutions, whether in common or statutory law, from whence his argument ought to be drawn. He must be able to specify, and to arrange in their proper order, all the material objections of his antagonists: these he must likewise answer as they were proposed, *extempore*.

When, therefore, it is considered how difficult it is to temper the natural associations of memory with the artificial arrangements of judgment, the desultory flights of imagination with the calm and regular deductions of reason, the energy and perturbation of passion with the coolness and tranquillity of deliberation, some idea may be formed of the arduous task which every blind man must achieve, who undertakes to pursue the law as a profession. Perhaps assistances might be drawn from Cicero's treatise on Topics and on Invention; which, if happily applied and improved, might lessen the disparity of a blind man to others, but could scarcely place him on an equal footing with his brethren. And it ought to be fixed as an inviolable maxim, that no

Blind.

28
Law difficult, though not impossible, for the blind.

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Blind.

blind man ought ever to engage in any province in which it is not in his power to excel. This may at first sight appear paradoxical; but it is easily explained. For the consciousness of the obvious advantages possessed by others, habitually predisposes a blind man to despondency: and if he ever gives way to despair (which he will be too apt to do when pursuing any acquisition where others have a better chance of success than himself), adieu, for ever adieu, to all proficiency. His soul sinks into irremediable depression; his abortive attempts incessantly prey upon his spirit; and he not only loses that vigour and elasticity of mind which are necessary to carry him through life, but that patience and serenity which alone can qualify him to enjoy it.

In this recapitulation of the learned professions, we have intentionally omitted physick; because the obstacles which a blind man must encounter, whether in the theory or practice of that art, will be more easily conceived by our readers than described in detail. From this, therefore, let us pass to more general subjects.

It has been formerly hinted, that the blind were objects of compassion, because their spheres of action and observation were limited: and this is certainly true. For what is human existence, in its present state, if you deprive it of action and contemplation? Nothing then remains but the distinction which we derive from form or from sensitive and loco-motive powers. But for these, unless directed to happier ends by superior faculties, few rational beings would, in our opinion, be grateful. The most important view, therefore, which we can entertain in the education of a person deprived of sight, is to redress as effectually as possible the natural disadvantages with which he is encumbered; or, in other words, to enlarge as far as possible the sphere of his knowledge and activity. This can only be done by the improvement of his intellectual, imaginative, or mechanical, powers; and which of these ought to be most assiduously cultivated, the genius of every individual alone can determine. Were men to judge of things by their intrinsic natures, less would be expected from the blind than others. But, by some pernicious and unaccountable prejudice, people generally hope to find them either possessed of preternatural talents, or more attentive to those which they have than others: For it was not Rochester's opinion alone,

That if one sense should be suppress'd,
It but retires into the rest.

Hence it unluckily happens, that blind men, who in common life are too often regarded as rare-shows, when they do not gratify the extravagant expectations of their spectators, too frequently sink in the general opinion, and appear much less considerable and meritorious than they really are. This general diffidence of their powers at once deprives them both of opportunity and spirit to exert themselves; and they descend, at last, to that degree of insignificance in which the public estimate has fixed them. From the original dawning, therefore, of reason and spirit, the parents and tutors of the blind ought to inculcate this maxim, That it is their indispensable duty to excel, and that it is absolutely in their power to attain a high degree of eminence. To impress this notion on their minds, the first objects presented to their observation, and the first methods of improvement applied to their understanding, ought, with no great difficulty, to be comprehensible

by those internal powers and external senses which they possess. Not that improvement should be rendered quite easy to them, if such a plan were possible. For all difficulties, which are not really or apparently insuperable, heighten the charms and enhance the value of those acquisitions which they seem to retard. But, care should be taken that these difficulties be not magnified or exaggerated by imagination; for it has before been mentioned, that the blind have a painful sense of their own incapacity, and consequently a strong propensity to despair continually awake in their minds. For this reason, parents and relations ought never to be too ready in offering their assistance to the blind in any office which they can perform, or in any acquisition which they can procure for themselves, whether they are prompted by amusement or necessity. Let a blind boy be permitted to walk through the neighbourhood without a guide, not only though he should run some hazard, but even though he should suffer some pain.

If he has a mechanical turn, let him not be denied the use of edge-tools; for it is better that he should lose a little blood, or even break a bone, than be perpetually confined to the same place, debilitated in his frame, and depressed in his mind. Such a being can have no employment but to feel his own weakness, and become his own tormentor; or to transfer to others all the malignity and peevishness arising from the natural, adventitious, or imaginary, evils which he feels. Scars, fractures, and dislocations, in his body, are trivial misfortunes compared with imbecility, timidity, or fretfulness of mind. Besides the sensible and dreadful effects which inactivity must have in relaxing the nerves and consequently in depressing the spirits, nothing can be more productive of jealousy, envy, peevishness, and every passion that corrodes the soul to agony, than a painful impression of dependence on others, and of our insufficiency for our own happiness. This impression, which, even in his most improved state, will be too deeply felt by every blind man, is redoubled by that utter incapacity of action which must result from the officious humanity of those who would anticipate or supply all his wants, who would prevent all his motions, who would do or procure every thing for him without his own interposition. It is the course of nature, that blind people, as well as others, should survive their parents; or it may happen that they should likewise survive those who, by the ties of blood and nature, are more immediately interested in their happiness than the rest of mankind. When, therefore, they fall into the hands of the world in general, such exigencies as they themselves cannot redress will be but coldly and languidly supplied by others. Their expectations will be high and frequent, their disappointments many and sensible; their petitions will often be refused, seldom fully gratified; and, even when granted, the concession will be so ungrateful, as to render its want infinitely more tolerable than its fruition. For all these reasons, we repeat it once more (because it can never be too frequently reiterated), that, in the formation of a blind man, it is infinitely better to direct than supersede his own exertions. From the time that he can move and feel, let him be taught to supply his own exigencies; to dress and feed himself; to run from place to place, either for exercise, or in pursuit of his own toys or necessities.

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In these excursions, however, it will be highly proper for his parent or tutor to superintend his motions at a distance, without seeming to watch over him. A vigilance too apparent, may impress him with a notion that malignity or some other selfish motive may have produced it. When dangers are obvious and great, such as we incur by rivers, precipices, &c. those who are entrusted with the blind will find it neither necessary nor expedient to make their vigilance a secret. They ought then to acquaint their pupil, that they are present with him; and to interpose for his preservation, whenever his temerity renders it necessary. But objects of a nature less noxious, which may give him some pain without any permanent injury or mutilation, may with design be thrown in his way, providing, however, that this design be always industriously concealed. For his own experience of their bad effects will be an infinitely more eloquent and sensible monitor, than the abstract and frigid counsels of any adviser whatever.

When the volatile season of puerile amusement is expired, and the impetuous hurry of animal-spirits subsides, through the whole demeanour of his pupil the tutor will probably observe a more sensible degree of timidity and precaution, and his activity will then require to be stimulated more than restrained. In this crisis, exercise will be found requisite, rather to preserve health, and facilitate the vital functions, than merely for recreation. Of all the different kinds of exercise, riding, not in a machine, but on horseback, is by far the most eligible, and most productive of its end. On these occasions, however, care must be taken that the horses employed may neither be capricious nor unmanageable; for on the manufacture of the creature which he rides, not only his safety, but his confidence, will entirely depend. In these expeditions, whether long or short, his companion or attendant ought constantly to be with him; and the horse should always either be taught implicitly to follow its guide, or be conducted by a leading rein besides the bridle which he himself holds. Next to this mode of exercise, is walking. If the constitution of the blind boy be tolerably robust, let him be taught to endure every vicissitude of weather which the human species can bear with impunity. For if he has been bred with too much delicacy, particular accidents may supersede all his former scruples, and subject him to the necessity of suffering what will not only be severe in its immediate sensation, but dangerous in its future consequences. Yet, when the cold is so intense, or the elements so tempestuous, as to render air and exercise abroad impracticable, there are methods of domestic exercise, which, though not equally salutary, may still be eligible; such as dumb-bells, or the bath-chair. The first of these are made of lead, consisting of a cylinder, the middle of which may either be rectilinear or arcuated for the convenience of holding, and terminates at each end in a semiglobular mass. Their weight should be conformed to the strength and age of the person who uses them. The method of employing them is to take one in each hand, and swing them backwards and forwards over his head, describing a figure somewhat like a parabola. This not only strengthens the arms, and opens the chest, but promotes the circulation of the fluids. The bath-chair is a deal of 12 feet in length, as free from knots and as elastic as possible, supported by a fulcrum at each end, upon

which may be placed two rolling cylinders to give it greater play; when seated upon this, by alternately depressing it with his own weight, and suffering it to return to its natural situation, he gives himself a motion though not equal in its energy, yet somewhat resembling the trot of a horse. There are other elastic seats of the same kind constructed with steel springs, but one of this simple fabrication may answer the purpose.

His meals should be temperate, his diet light and of easy digestion. If the tone of his stomach be vigorous, vegetables should be preferred to animal-food, particularly those vegetables which are most farinaceous and least acceft. Fermented liquors and ardent spirits should never be given him but to gratify the real demands of exhausted nature. For though they exhilarate the spirits, they at the same time corrode the vessels and relax the nerves, a misfortune doubly pernicious to sedentary life. The safest and most wholesome beverages are milk and water. If he should be tired with these, he may be indulged with the variety of chocolate, balm, sage, or ground-ivy. Coffee may sometimes be taken with impunity: but tea should be interdicted with inflexible severity; for no vegetable juice under heaven is more noxious to sedentary people*. Let him also, for similar reasons, be prohibited the use of tobacco in all its forms. In the observations of diet and exercise, let him neither be mechanically regular, nor entirely excentric. In the one case, he will be a slave to habit, which may create some inconvenience; in the other, he will form no habits at all, which may still be productive of greater.

The natural curiosity of children renders them extremely and indefatigably inquisitive. This disposition is often peculiarly prevalent in the blind. Parents and tutors, therefore, should gratify it whenever their answers can be intelligible to the pupil; when it is otherwise, let them candidly confess the impossibility or impropriety of answering his questions. At this period, if their hearts be tender and their powers inventive, they may render his amusements the vehicles, and his toys the instruments, of improvement: why, for instance, may not the centrifugal and centripetal forces be illustrated from the motion of a top, or the nature and power of elasticity by the rebound of a ball. These hints may lead to others, which, if happily improved and applied, may wonderfully facilitate the progress of knowledge. Nor will the violence of exercise, and the tumult of play, be productive of such perils and accidents as may be apprehended.

For the encouragement of such parents as chuse to take these advices with regard to exercise, let us inform them, that though, till the age of twenty, some blind persons were on most occasions permitted to walk, to run, to play at large, they have yet escaped without any corporeal injury from these excursions.

Parents of middle, or of higher rank, who are so unfortunate as to have blind children, ought, by all possible means, to keep them out of vulgar company. The herd of mankind have a wanton malignity, which eternally impels them to impose upon the blind, and to enjoy the painful situations in which these impositions place them. This is a stricture upon the humanity of our species, which nothing but the love of truth and the dictates of benevolence could have extort-

Blind.

29
Diet.

* See the article Thea.

30
Natural curiosity to be gratified, when possible; when otherwise, a reason to be given.31
The blind not to be indulged in promiscuous company.

Blind.

ed from us. But we (F) have known some who have suffered so much from this diabolical mirth in their own persons, that it is natural for us, by all the means in our power, to prevent others from becoming its victims.

Blind people have infinitely more to fear from the levity and ignorance, than from the selfishness and ill-nature, of mankind. In serious and important negotiations, pride and compassion suspend the efforts of knavery or spleen; and that very infirmity, which so frequently renders the blind defenceless to the arts of the insidious, or to the attempts of malice, is a powerful incentive to pity, which is capable of disarming fury itself. Villany, which frequently piques itself more upon the arts by which it prevails, than upon the advantages which it obtains, may often with contempt reject the blind, as subjects beneath the dignity of its operation; but the ill-natured buffoon considers the most malicious effects of his merriment as a mere jest, without reflecting on the shame or indignation which they inspire when inflicted on a sensible temper.

32
They must not be permitted to hear marvellous and frightful tales.

But vulgar credulity and ignorance are no less dangerous to those who want fight, than the false and mechanical wit so universally practised in common life. We know, we sympathetically feel, the strong propensity of every illiterate mind, to relate or to believe whatever is marvellous and dreadful. These impressions, when early imbibed, can scarcely be eradicated by all the conspiring efforts of mature reason, and confirmed experience. Those philosophers who have attempted to break the alliance between darkness and spectres, were certainly inspired by laudable motives. But they must give us leave to assert, that there is a natural and essential connection betwixt night and *orcus*. Were we endued with senses to advertise us of every noxious object before its contiguity could render it formidable, our panics would probably be less frequent and sensible than we really feel them. Darkness and silence, therefore, have something dreadful in them, because they supersede the vigilance of those senses which give us the earliest notices of things. If you talk to a blind boy of invisible beings, let benevolence be an inseparable ingredient in their character. You may, if you please, tell him of departed spirits, anxious for the welfare of their surviving friends; of ministering angels, who descend with pleasure from heaven to execute the purposes of their Maker's benignity; you may even regale his imagination with the sportive gambols and innocent frolics of fairies; but let him hear as seldom as possible, even in stories which he knows to be fabulous, of plaintive ghosts, vindictive fiends, or avenging furies. They seize and pre-occupy every avenue of terror which is open in the soul; nor are they easily dispossessed. Sooner should we hope to exorcise a ghost, or appease a fury, than to obliterate their images in a warm and susceptible imagination, where they have been habitually impressed, and where these feelings cannot be dissipated by external phenomena. If horrors of this kind should agitate the heart of a blind boy, (which may happen notwithstanding the most strenuous endeavours to prevent it), the stories which

33
The association between darkness and spectres founded in nature.

34
The method of dissipating the fears of the blind.

he has heard will be most effectually discredited by ridicule. This, however, must be cautiously applied, by gentle and delicate gradations. If he is inspired with terror by effects upon his senses, the causes of which he cannot investigate, indefatigable pains must be taken to explain these phenomena, and to confirm that explication, whenever it can be done, by the testimony of his own senses and his own experience. The exertion of his locomotive and mechanical powers (the rights of which we have formerly endeavoured to assert) will sensibly contribute to dispel these terrors.

His inventive faculties ought likewise to be indulged with the same freedom. The data which they explore may be presented in such a manner, as to render discoveries easy; but still let invention be allowed to co-operate. The internal triumph and exultation which the mind feels from the attainment and conviction of new truths, heightens their charms, impresses them deep on the memory, and gives them an influence in practice of which they could not otherwise have boasted.

There are a sort of people in the world, whose views and education have been strictly confined to one province, and whose conversation is of consequence limited and technical. These, in literary intercourse, or fashionable life, are treated with universal contempt, and branded with the odious name of *mere men of business*. Nor is it any wonder, that the conversation of such should prove nauseous and disgusting. It would be arrogance in them to expect, that indifferent persons should either enter into their private interests, or the peculiarities of their craft, with a warmth equal to their own. We have known the intrusion of such a person involve a numerous company in gloom, and terminate the freedom and vivacity of agreeable discourse in lazy yawning and discontented silence. Of all innocent characters, this ought to be avoided by the blind; because, of all others, it is the character which they run the greatest hazard of adopting. The limitation of their powers naturally contracts their views and pursuits, and, as it were, concentrates their whole intellectual faculties in one, or at best in few objects. Care should therefore be taken to afford the mind a theatre for its exertions, as extensive as possible, without diverting it from one great end, which, in order to excel, it ought for ever to have in prospect.

There are few sciences in which the blind have not distinguished themselves: even those whose acquisition seemed essentially to depend upon vision, have at last yielded to genius and industry, tho' deprived of that advantage. Mr Sanderfon, whom we formerly mentioned, has left behind him the most striking evidences of astonishing proficiency in those retired and abstract branches of mathematics which appeared least accessible to persons of his infirmity. Sculpture (G) and painting are not, perhaps, the most practicable arts for a blind man; yet is he not excluded from the pleasing creation and extensive regions of fancy. However unaccountable it may appear to the abstract philosopher, yet nothing is more certain in fact, than that a blind man may, by the inspiration of the muses, or, to strip the

(F) The author of these observations, though he chuses to express himself in this manner, is blind.

(G) Yet there are instances of persons who have been enabled to take the figure and idea of a face by the touch, and mould it in wax with the utmost exactness; as was the case of the blind sculptor mentioned by De Piles, who thus took the likeness of the duke de Bracciano in a dark cellar, and made a marble statue of king Charles I. with great elegance and justness. Vid. *De Piles Cours de Peint.* p. 329. and *Wolf. Psychol. Rat.* § 162.

the figure of its mythological drefs, may, by the efforts of a cultivated genius, exhibit in poetry the moft natural images and animated descriptions, even of vifible objects, without either incurring or deferving the imputation of plagiarism.

In the filter art of mufic, there are, at prefent, living and noble inftances how far the blind may proceed.

If we look into former periods, we fhall find illuftrious and pregnant examples, how amply nature has capacitated the blind to excel both in the fcientific and practical departments of mufic. In the 16th century, when the progrefs of improvement both in melody and harmony was rapid and conspicuous, Francifcus Salinas was eminently diftinguifhed. He was born A. D. 1513, at Burgos in Spain; and was fon to the treafurer of that city. Tho' afflicted with incurable blindness, he was profoundly fkilld both in the theory and practice of mufic. As a performer, he is celebrated by his cotemporaries with the higheft encomiums. As a theorift, his book, if we may believe Sir John Hawkins, is equal in value to any now extant in any language. Tho' he was deprived of fight in his earlieft infancy, he does not content himfelf to delineate the various phenomena in mufic, but the principles from whence they refult, the relations of found, the nature of arithmetical, geometrical, and harmonical ratios, which at that period were efteemed effential to the theory of mufic, with a degree of intelligence which would have deferved admiration tho' he had been in full poffeffion of every fenfe requifite for thefe difquisitions. He was taken to Rome in the retinue of Petrus Sarmentus archbifhop of Compafella; and having paffed twenty years in Italy, he returned to Salamanca, where he obtained the profefhorfhip of mufic, an office at that time equally refpectable and lucrative. Having difcharged it with reputation and fuccels for fome time, he died at the venerable age of 77.

In the fame period flourifhed Cafpar Krumbhorn, blind from the third year of his age: yet he compofed feveral pieces in many parts with fo much fuccels, and performed both upon the flute and violin fo exquisitely, that he was diftinguifhed by Auguftus elector of Saxony. But preferring his native Silefia to every other country, he returned thither, and was appointed organift of the church of St Peter and Paul in the city of Lignitz, where he likewife had often the direction of the mufical college, and died June 11th 1621.

To thefe might be added Martini Pefenti of Venice, a compofer of vocal and instrumental mufic almoft of all kinds, tho' blind from his nativity; with other examples equally worthy of public attention. But if vulgar prejudice is capable of blufhing at its own contemptible character, or of yielding to conviction, thofe already quoted are more than fufficient to fhew the mufical jugglers of our time, who are generally as abfolute ftrangers to learning and tafte as to virtue, that their art is no monopoly with which thofe alone who fee are invefted by the irrevocable decree of heaven.

For Sanderfon's method of calculation, both in arithmetic and algebra, fee the account prefixed to his own treatife on that fubject. But there is a much fuller and more circumftantial detail both of its nature and its various ufes, given by Mr Diderot in his "Letter concerning the Blind, for the ufe of thofe who "fee," which we fhall here tranflate.

"It is much eafier (fays that author) to ufe figns already invented, than to become their inventor; as one is forced to do, when engaged in circumftances for which he is not provided. Of what advantage might not this be to Sanderfon to find a palpable arithmetic already prepared for him at five years of age, which he might otherwife have felt the neceffity of inventing for himfelf at the advanced period of twenty-five? This Sanderfon, Madam, is an author deprived of fight, with whom it may not be foreign to our purpofe to amufe you. They relate prodigies of him; and of thefe prodigies there is not one, which his progrefs in the belles lettres, and his mathematical attainments, do not render credible.

"The fame inftrument ferved him for algebraical calculations, and for the conftruction of rectilinear figures. You would not, perhaps, be forry that I fhould give you an explication of it, if you thought your mind previously qualified to underftand it: and you fhall foon perceive that it prefuppofes no intellectual preparations of which you are not already miftrefs; and that it would be extremely ufeful to you if you fhould ever be feized with the inclination of making long calculations by touch.

"Imagine to yourfelf a fquare, fuch as you fee, fig. 1. n^o 1. divided into four equal parts by perpendicular lines at the fides, in fuch a manner, that it may prefent you the nine points 1, 2, 3, 4, 5, 6, 7, 8, 9. Suppofe this fquare pierced with nine holes capable of receiving pins of two kinds, all of equal length and thicknefs, but fome with heads a little larger than the others. Plate LVI.

"The pins with large heads are never placed any where elfe but in the centre of the fquare; thofe with fmaller heads never but at the fides, except in one fingle cafe, which is that of making the figure 1, where none are placed at the fides. The fign of nothing is made by placing a pin with a large head in the centre of the little fquare, without putting any other pin at the fides*. * See Fig. 1. n^o 2. The number 1 is reprefented by a pin with a fmall head placed in the centre of the fquare, without putting any other pin at the fides: the number 2 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 1: the number 3 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 2: the number 4 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 3: the number 5 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 4: the number 6 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 5: the number 7 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 6: the number 8 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 7. The number 9 by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 8.

Blind.

No 2.

38
This notation applied to numerical operations.

"Here are plainly ten different expressions obvious to the touch, of which every one answers to one of our ten arithmetical characters. Imagine now a table as large as you please, divided into small squares, horizontally ranged, and separated one from the other at similar distances, as you see it in No 3. Thus you will have the instrument of Sanderfon.

"You may easily conceive that there is not any number which one cannot express upon this table; and, by consequence, no arithmetical operation which one cannot execute upon it.

"Let it be proposed, for instance, to find the sum, or to work the addition, of the nine numbers following.

1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	0
7	8	9	0	1
8	9	0	1	2
9	0	1	2	3

"I express them on the table in the order as they are dictated to me; the first figure at the left of the first number, upon the first square to the left of the first line; the second figure, to the left of the first number, upon the second square to the left of the same line; and so of the rest.

"I place the second number upon the second row of squares, units beneath units, and tens beneath tens, &c.

"I place the third number upon the third row of squares, and so of the rest. Then with my fingers running over each of the rows vertically from the bottom to the top, beginning with that which is nearest to my right, I work the addition of the numbers which are expressed, and mark the surplus of the tens at the foot of that column. I then pass to the second column, advancing towards the left; upon which I operate in the same manner; from thence to the third; and thus in succession I finish my addition.

"We shall now see how the same table served him for demonstrating the properties of rectilinear figures. Let us suppose this proposition to be demonstrated, That parallelograms which have the same basis and the same height are equal in their surfaces. He placed his pins as may be seen fig. 1. No 4. He gave names to the angular points, and finished his demonstration with his fingers.

"If we suppose that Sanderfon only employed pins with large heads, to mark the limits of his figures, around these he might arrange his pins with small heads in nine different manners, all of which were familiar to him. Thus he scarcely found any embarrassment but in those cases where the great number of angular points which he was under a necessity of naming in his demonstration obliged him to recur to the letters of the alphabet. We are not informed how he employed them.

"We only know, that his fingers ran over the board with astonishing agility; that he undertook with success the longest calculations; that he could interrupt the series, and discover his mistakes; that he proved them with the greatest ease; and that his labours required infinitely less time than one could have

imagined, by the exactness and promptitude with which he prepared his instruments and disposed his table.

"This preparation consisted in placing pins with large heads in the centres of all the squares: having done this, no more remained to him but to fix their values by pins of smaller heads, except in cases where it was necessary to mark an unit; then he placed in the centre of a square a pin with a small head, in the place of a pin with a large head with which it had been occupied.

"Sometimes, instead of forming an entire line with these pins, he contented himself with placing some of them at all the angular points, or points of intersection; around which he tied silk threads, which finished the formation of the limits of his figures *."

It may be added by way of improvement, that for the division of one series of numbers from another, a thin piece of timber in the form of a ruler with which lines are drawn, having a pin at each end for the holes in the squares, might be interposed between the two series to be distinguished.

This geometrician left other instruments behind him; but as we do not know their uses, we need not add their descriptions.

In the higher parts of mathematics, such as conic sections, the same solid figures which are mediums of perception to those who see, may perform the same useful office to the blind. But, for the structure of superficial figures, we should imagine, that a kind of matter might be found, soft enough to be easily susceptible of impressions, yet hard enough to retain them till effaced by an equal pressure. Suppose, for instance, a table were formed, four feet broad and eight in length; for the figures, that they may be the more sensible to the touch, ought to be larger than ordinary. Suppose this table had brims, or a moulding round it, rising an inch above the surface: let the whole expanse, then, be filled with bee's-wax, and the surface above pressed extremely even with a polished board, formed exactly to fit the space within the mouldings. This board will always be necessary to efface the figures employed in former propositions, and prepare the surface for new ones. We think we have pondered the minutest inconvenience that can arise from this method of delineating and conceiving geometrical truths; and, after all, the table appears to us the best and the least troublesome apparatus which a blind man can use. We can see no reason, why general ideas of geography or topography might not be conveyed to him in the same manner, by spheres composed of or covered with the same incompressible matter. The knowledge of astronomy might likewise be of infinite use, both by enlarging his ideas of the universe, and by giving him higher and more confirmed impressions of that energy by which the stars are moved, and of that design by which their motions are regulated. But these objects are too vast; their distances, their magnitudes, their periods of revolution, are too complex to be comprehended in the mind, or impressed on the memory, without sensible mediums. For this purpose, an orrery, or some machine of a similar construction, will be indispensably requisite.

The science of causes and effects might likewise yield him the most sublime and rational entertainment of which

39
The same instrument applied to the construction of rectilinear figures.

Preparation of the instrument

* See No 4.

A new method of instruments proposed

Geographical instruments proposed by the blind

The blind susceptible of astronomical my.

Of natural philosophy



which an intelligent being, in his present state, is susceptible. By this he might enter into the laws, the vicissitudes, the œconomy, of nature. Nor is it absolutely necessary that he should be an ocular witness of the experiments by which these laws are detected and explained. He may safely take them for granted; and if, at any time, a particular experiment should prove faithless, he may, from general principles, be able to discover its fallacy, whether in the nature of the subject, the inaptitude of the instruments, or the process of the execution. The laws of motion, the various ratios or proportions of forces whether simple or compound, he may calculate and ascertain by the same means, and in the same method, so happily used by Sanderfon.

Moral and theological knowledge he may easily obtain, either from books, or instructions delivered *viva voce*. The last, if communicated by one who understands and feels the subject, with a proper degree of perspicuity and sensibility, are infinitely the most eligible. By morals, we would not merely be understood to mean a regular and inculcable series of action, but the proper exertion and habitual arrangement of the whole internal œconomy, of which external actions are no more than mere expressions, and from which the highest and most permanent happiness alone can proceed. By theology, we do not mean that systematic or scholastic jargon, which too frequently usurps its venerable name; but those sublime and liberal ideas of the nature and government of a Supreme Being, whether discoverable by nature, or revealed in scripture, which enforce every moral obligation, which teach us what is the ultimate good of our nature, which determine our efforts, and animate our hopes in pursuing this most important of all objects. What Cicero says of the arts and sciences may, with great propriety, be applied to religion: *Nam cœtera neque temporum sunt, neque ætatum omnium, neque locorum; et hæc studia adolescentiam alunt, senectutem oblectant, secundas res ornant, adversis perfugium ac solatium præbent: delectant domi, non impediunt foris; pernoctant nobiscum, perigrinantur, rusticantur*. Translated thus: 'For other studies are not suited to every time, to every age, and to every place: but these give strength in youth, and joy in old age; adorn prosperity, and are the support and consolation of adversity; at home they are delightful, and abroad they are easy; at night they are company to us; when we travel, they attend us; and in our rural retirements, they do not forsake us.'

To this may be added, that the joys of religion are forever adequate to the largest capacity of a finite and progressive intelligence; and as they are boundless in extent, so they are endless in duration. We have already, more than once, observed, that the soul of a blind man is extremely obnoxious to melancholy and dejection. Where, therefore, can he find a more copious, intimate, permanent, and efficacious source of comfort than in religion? Let this then be inculcated with the utmost care and assiduity. Let the whole force of the soul be exerted in shewing him that it is reasonable. Let all the noblest affections of the heart be employed in recommending it as amiable; for we will venture to assert, that the votary of religion alone is the man,—

*Quem, si fractus illibatur orbis,
Impavidum ferient ruine.*

Thus translated;

Whom, though with nature's wreck oppress'd,
Unnearly fears could ne'er offend.

When the situation of the blind, and its natural effects upon their characters, are considered; when we reflect how exquisite their distresses, how pungent their disappointments, how sensible their regrets, how tedious and gloomy their periods of solitude; we must be wretches indeed, if we can grudge either labour or expense in procuring them every source of entertainment, which, when procured, remains in their own power, and yields what may be in some measure termed *self-derived enjoyment*. These amusements are prolific of numberless advantages: they afford us at once entertainment and exertion: they teach us to explore a thousand resources for preservation and improvement, which would otherwise have escaped our attention: they render us awake and sensible to a thousand notices both of external and intellectual objects, which would otherwise have passed unobserved.

Thus far have we proceeded without mentioning philosophical learning; though we know it to be attainable by the blind in a high degree, and though we are conscious of its importance both to their life and ornament. But as it is not indispensable, and as its acquisition is tedious and operose, we thought it less necessary to be early and minutely specified. We cannot doubt, that learning different languages adds to the treasure of our ideas, and renders those which we possess more clear and definite. It must be acknowledged, that the possession of other languages elucidates our own. The technical terms of almost every science are exotic; and without clearly understanding those, we cannot properly possess the ideas of which they are the vehicles. But these motives are common to every candidate for philological improvement with the blind.

The paths of grammar, however, are dry and rugged; and it will be necessary for the pedagogue, whoever he is, to take all the opportunities that offer of enlightening the darkness and polishing the asperities of the road. When, therefore, the intellect of the pupil begins to open and exert its penetration, it will be proper to shew him how the nature, the forms, and arrangements, of words, flow from our ideas and their relations. Every substance must naturally be in some state; it must either act, or be acted upon. The actions which it performs or suffers must be performed or suffered in some definite manner or degree. It must likewise have some qualities, whether temporary and accidental, or natural and permanent. These qualities must likewise be susceptible of degrees. When different substances are considered in the same state, its common participation forms a connection: when regarded in different states, that difference forms an opposition. The constant repetition of the names of substances and qualities produces a disagreeable monotony in language. They must therefore be implied in other words, which likewise in some cases serve to connect the parts of a sentence. There is a difference between such words as imply the connection of sentences, and such as imply the connection of states or circumstances. Actions to be performed or suffered may be either positively affirmed

Of gram-
mar.

Blind.

of any substance, or merely attributed to them. Living and percipient substances have immediate sensations of pain or pleasure, which likewise are productive of desire and aversion. To these sentiments particular sounds are adapted, whether immediately inspired by nature, or resulting from association and tacit convention.

Thus we have a foundation for all the different parts of speech; and from their natures and offices their forms and arrangements may be deduced, according to the analogy of every language.

The art of reasoning, the knowledge of history, and a taste for the *belles lettres*, are easily attainable by the blind; and as they are copious funds of entertainment, they should be inculcated, tho' at the expense of care and labour.

The relations of persons subjected to this misfortune, if in easy circumstances, will find it highly conducive to the improvement of their charge, to select some one among his coevals, of a sound understanding, a sweet and patient temper, a docile mind, a warm heart, and a communicative disposition. These two should be taught to find their interest and happiness in their connection one with another. Their bed, their board, their walks, their entertainments, their lessons, should be common. These are the best eyes with which art can endow a blind man; and, if properly selected, they will on some occasions yield very little, in utility and perfection, to those of nature; nay, at some junctures they may be preferable.

If the blind must depend upon the exercise of their own powers for bread, we have already pointed out music as their easiest and most obvious province; but let it at the same time be remembered, that mediocrity in this art may prove the bitterest and most effectual curse which a parent can inflict upon his offspring, as it subjects them to every vicious impression or habit which may be imbibed or contracted from the lowest and most abandoned of mankind. If your pupil, therefore, be not endowed with natural talents exquisitely proper both for the theory and practice of this art, suffer him by no means to be initiated in it. If his natural genius favours your attempts, the spinet, harp, or organ, are the most proper instruments for him to begin; because, by these instruments, he may be made more easily acquainted with the extent of musical scales, with the powers of harmony, with the relations of which it is constituted, and of course with the theory of his art. It would be not only unnecessary, but impracticable, to carry him deep into the theory, before he has attained some facility in the practice. Let, therefore, his head and his hands, (if we may use the expression), be taught to go *pari passu*. Let the one be instructed in the simplest elements; and the others conducted in the easiest operations, first: contemplation and exercise will produce light in the one and promptitude in the other. But, as his capacity of specula-

tion and powers of action become more and more mature, discoveries more abstract and retired, talks more arduous and difficult, may be assigned him. He should be taught the names and gradations of the diatonic scale, the nature and use of time, the diversity of its modes whether simple or mixed. He should be taught the quantity or value of notes, not only with respect to their pitch, but to their duration. Yet, let him be instructed not to consider these durations as absolutely fixed, but variable according to the velocity of the movements in which they are placed. Thus we reckon a semibreve equal to 4 vibrations of a pendulum; a minim to 2; a crotchet to 1, &c. But, if the number of aliquot parts, into which a semibreve is divided, be great, and consequently the value of each particular part small, the minim, crotchet, quaver, &c. will increase in their intrinsic durations, though they must always preserve the same proportions relatively one to another. He should never be habituated to take a piece of music, either from the sound of a voice or an instrument. His companion ought to read the music by the names and values of its characters, with the same exactness as the words in any other language. When he becomes a considerable adept in the art, tangible signs may be invented, by which he may not only be enabled to read, but even to set, music for himself. Such exercises will render him infinitely more accurate, both in his principles and practice, than he would otherwise be.

There is a hint of such tangible signs given in Tansure's musical grammar, p. 93. and which, tho' (like the rest of the book) obscure and indigested, may be improved and applied with advantage.

For the sake of those in whose hands it may not be, we quote the passage at length.

"As it is the pleasure of the Almighty, that some persons are destitute of *eye-sight*; in like manner it is his infinite goodness to make them a double amends another way, by giving them a greater share of memory, &c. whereby they become very dexterous in playing on musical instruments, mathematics, &c. as we may observe by Dr Stanley, organist of St Andrews, Holburn, in London; and the blind professor of mathematics in the university of Cambridge; and many others, too tedious here to mention, who were born *blind*, and never saw the least glance of light; yet God gave them such a light in *knowledge*, that they became the wonder of all such as had the benefit of seeing, &c.

"And as *blind persons*, at first, cannot possibly have so clear an idea of *notes*, and *musical characters*, as they that see them, until they are taught by a master or tutor; I have (for the good-will I bear to such unfortunate persons) contrived the following table; that, by *feeling*, they may understand notes, and learn any tune that shall be set them, in their master's absence.

47
The blind
susceptible
of logic, his-
tory, and the
belles
lettres.

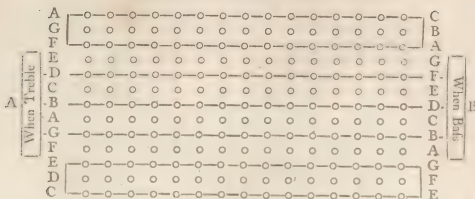
48
A compa-
nion should
be united to
the blind
by more
than the ties
of interest
and conven-
iency.

49
Music one
of the most
proper em-
ployments
for the
blind. Me-
diocrity,
however,
pernicious.

Blind.

sc.
Scheme
musical
taion.

A New MUSIC-TABLE for such as are BLIND.



EXPLANATION.

"Let A—B be a smooth board, 3 or 4 feet long, 1 inch thick, and 9 inches wide, with 5 square ledges glued thereon, each being half an inch asunder, half an inch wide, and half an inch high; which rising ledges represent our 5 lines of music, and their spaces: and the two outward lines, being made a little lower, may serve as ledger lines, on occasion. The cyphers represent so many holes bored into every line and space, half an inch asunder; wherein pegs of different shapes are to be set, to represent the several sorts of notes and characters of the tune: which pegs the blind person may know by feeling, as well as he does his keys of the organ or harpsichord: so that, by keeping his fingers on the 5 lines, he feels the several pegs as they come on, and are set to represent the several sorts of notes, on both line and space; whilst his right hand strikes the respective key, &c. he first knowing the names of all his keys, his lines, spaces, and the mark of every pegg. Let each pegg be about half an inch high, when set in very fast.

"N. B. The blind person must first be taught the names of the above lines and spaces in both the treble and bass cliffs; and that he must feel his treble with his right hand, and his bass with the left hand; each being contrary, as you may see by the letters of the above table, A and B; and must learn each part separate.

Of Peggs for Notes, &c.

"Of peggs, he must have a great number of every sort, to set his tune with, which he may mark as follows:

For a *Semibrieve*, 4 top-notches.

Minim, 2 top-notches.

Crotchet, 1 top-notch.

Quaver, one corner cut off.

Semiquaver, 2 corners cut off.

Demisemiquaver, all 4 corners cut off.

Rests, a notch in the corner.

A *Flat*, 1 notch on the side.

Sharp, 2 notches on the side.

Point, 3 notches on the side.

Bar, a flat thin top.

Repeat, a sharp-pointed top, &c. &c. &c.

"But it is best for every performer to make and mark his own peggs; and deliver them one by one as they are called for by the person that sets his tune."

Thus far our author. It is certain, that when playing concerto's, or, if you please, when performing in

score, the blind must depend upon memory, and upon memory alone: but happily their retentive powers are remarkably strong; and there are few pieces in music which will be found either too intricate to be acquired, or too long to be remembered, by a person deprived of sight. Mr Stanley, the gentleman formerly mentioned by Tanfure, performs what is still more astonishing. If our information, which we cannot doubt, be true, he accompanies any lesson with a thorough bass, tho' he never has heard it before. We have never yet heard of any person, though blessed with the full use of sight, and with all the advantages accruing from it, who could thus anticipate harmony before the chords were founded, and accompany it in a manner suitable to its nature.

When he becomes a more profound theorist, if he has adopted the notion that music and geometry are congenial and inseparable, (which, however, in our judgment is frivolous), he may peruse Malcolm's essay on music, and Treydel's theory and practice of music. But, if he chuses to hear the same principles delivered without that unnecessary parade and ostentation of profundity, let him be instructed by D' Alembert, (see the article *Music*, in this Dictionary); by Rameau, in his principles of composition; and by Rousseau's musical dictionary, (the substance of which is engrossed in the present Work, either under the respective detached articles, or in the notes added to the article *Music*). It is true, that the forms and proportions of instruments, the thickness, length, and tension of musical strings, may be mathematically adjusted; their relations one to another may be determined by the coincidence of their vibrations, or by the number and velocity of these vibrations when dissonant; but experience and a good ear are amply sufficient for these purposes. Yet, if the necessity of geometry in music should still remain an indelible article in his creed, he may peruse Dr Smith's philosophical principles of harmony. There has also lately been published an explication of Tartini's theory, entitled, *The principles and power of harmony*; which, after he has made considerable progress, may be read to him with sensible improvement.

Thus we have endeavoured to form an estimate of the inconveniences suffered, and the advantages possessed, by the blind; we have attempted to show, of what kind of culture their remaining faculties are susceptible, and what appeared to us the easiest and properest means of their improvement. We have illustrated not only its possibility, but its certainty, by incontestable facts, which

se
Apolitrophs
to the pe-
blic.

Blind.

which demonstrate, even in the eyes of scepticism and incredulity, to what degrees of eminence, both in the mechanical and liberal arts, the blind may be carried. It now remains to demand a categorical answer from society, whether it is more humane and eligible, that such unhappy persons should be suffered to languish out their lives in torpid and miserable obscurity, wretched in themselves and burdensome to others; or to cultivate and improve their powers in such a manner, as that they may be qualified for internal enjoyment and public utility? Surely there is not a human being, who does not disgrace the works of God, that can be at any loss in answering this question. Have we not then a right to call the world to an account? have we not a right to demand, why rational beings susceptible of felicity in themselves, and capable of transfusing happiness through the societies with whom they are connected, should be abandoned to a state of insignificance and misery? Is it possible that men who are every moment subjected to the same contingencies with which they behold their fellow-creatures afflicted, should not with all their souls endeavour to alleviate the misfortunes of their suffering brethren? Is the native and hereditary portion of human wisdom so light and supportable in itself, that we should neglect and despise those to whom it is embittered by accidental circumstances of horror and distress? You who are parents, who feel the strong and powerful pleadings of nature, do not, by a brutal negligence and insensibility, render the existence which you have given a curse to its possessors. Do not give them reason to upbraid your memory; and to answer those who ask what patrimony you have left them, that their sole inheritance was ignorance, incapacity, and indigence. You men of wealth and eminence, you whom Providence has rendered conspicuous on the theatre of nature, to whom it has given the noblest opportunities of participating the divine beatitude by the exercise of universal benevolence and genuine patriotism, yours is the glorious province of bringing neglected merit from obscurity, of healing the wounds inflicted by adverse fortune, and of cultivating these talents which may be exerted for your own advantage and the honour of your species. Thus you shall rise in the heraldry of heaven, and your names diffuse a lustre through the extent of space and the archives of eternity. Otherwise the temporary glare and parade of your situation can produce nothing else but a despicable mimicry of real and intrinsic greatness, and are no more than a splendid mask to cover what in itself is infamous or detestable.

By way of appendix to the preceding article, we shall add one or two very singular histories, with which it is hoped our readers will not be displeased.

An account of some remarkable particulars that happened to a lady after having had the constant kind of small-pox. [" In the course of this disease, during which the lady was attended by the late Sir Hans Sloane, several threatening symptoms appeared, which however were at length overcome; and the patient being thought out of danger, took several doses of such purgative medicines as are usually administered in the decline of the disease, without any bad consequence.

" But in the evening of the day on which she had taken the last dose that was intended to be given her

on that occasion, she was suddenly seized with pains and convulsions in the bowels; the pain and other symptoms became gradually less violent as the force of the medicine abated, and by such remedies as were thought best adapted to the case they seemed at length to be entirely subdued.

" They were, however, subdued only in appearance; for at eleven o'clock in the forenoon of the next day they returned with great violence, and continued some hours: when they went off, they left the muscles of the lower jaw so much relaxed, that it fell down, and the chin was supported on the breast. The strength of the patient was so much exhausted during this paroxysm, that she lay near two hours with no other signs of life than a very feeble respiration, which was often so difficult to be discerned, that those about her concluded she was dead.

" From this time the fits returned periodically every day, at about the same hour. At first they seemed to affect her nearly in the same degree; but at length all the symptoms were aggravated, the convulsions became more general, and her arms were sometimes convulsed alternately; it also frequently happened, that the arm which was last convulsed remained extended and inflexible some hours after the struggles were over. Her neck was often twisted with such violence, that the face looked directly backwards, and the back part of the head was over the breast; the muscles of the countenance were also so contracted and writhed by the spasms, that the features were totally changed, and it was impossible to find any resemblance of her natural aspect by which she could be known. Her feet were not less distorted than her head; for they were twisted almost to dislocation at the instep, so that she could not walk but upon her ancles.

" To remove or mitigate these deplorable symptoms, many remedies were tried; and, among others, the cold bath: but either by the natural effect of the bath, or by some mismanagement in the bathing, the unhappy patient first became blind, and soon afterwards deaf and dumb. It is not easy to conceive what could increase the misery of deafness, dumbness, blindness, and frequent paroxysms of excruciating pain: yet a very considerable aggravation was added; for the loss of her sight, her hearing, and her speech, was followed by such a stricture of the muscles of her throat, that she could not swallow any kind of aliment either solid or liquid. It might reasonably be supposed that this circumstance, though it added to the degree of her misery, would have shortened its duration: yet in this condition she continued near three quarters of a year; and during that time was supported in a very uncommon manner, by chewing her food only; which having turned often, and kept long in her mouth, she was obliged at last to spit out. Liquors were likewise gargled about in her mouth for some time; and then returned in the same manner, no part of them having passed the throat by an act of deglutition: so that whatever was conveyed into the stomach, either of the juices of the solid food, or of liquids, was either gradually imbibed by the sponginess of the parts, which they moistened, or trickled down in a very small quantity along the sides of the vessels.

" But there were other peculiarities in the case of this lady, yet more extraordinary. During the privation

tion of her *fight* and *hearing*, her *touch* and her *smell* became so exquisite, that she could distinguish the different colours of silk and flowers, and was sensible when any stranger was in the room with her.

"After she became blind, and deaf, and dumb, it was not easy to contrive any method by which a question could be asked her, and an answer received. This however was at last effected, by talking with the fingers, at which she was uncommonly ready. But those who conversed with her in this manner, were obliged to express themselves by touching her hand and fingers instead of their own.

"A lady who was nearly related to her, having an apron on, that was embroidered with silk of different colours, asked her, in the manner which has been described, if she could tell what colour it was? and after applying her fingers attentively to the figures of the embroidery, she replied, that it was red, and blue, and green; which was true. The same lady having a pink coloured ribbon on her head, and being willing still further to satisfy her curiosity and her doubts, asked what colour that was? her cousin, after feeling some time, answered that it was pink colour: this answer was yet more astonishing, because it shewed not only a power of distinguishing different colours, but different kinds of the same colour; the ribbon was not only discovered to be red, but the red was discovered to be of the pale kind called a *pink*.

"This unhappy lady, conscious of her own uncommon infirmities, was extremely unwilling to be seen by strangers, and therefore generally retired to her chamber, where none but those of the family were likely to come. The same relation, who had by the experiment of the apron and ribbon discovered the exquisite sensibility of her *touch*, was soon after convinced by an accident, that her power of *smelling* was acute and refined in the same astonishing degree.

"Being one day visiting the family, she went up to her cousin's chamber, and after making herself known, she intreated her to go down, and sit with her among the rest of the family, assuring her, that there was no other person present: to this she at length consented, and went down to the parlour door; but the moment the door was opened, she turned back, and retired to her own chamber much displeased; alleging, that there were strangers in the room, and that an attempt had been made to deceive her: it happened indeed that there were strangers in the room; but they had come in while the lady was above stairs, so that she did not know they were there. When she had satisfied her cousin of this particular, she was pacified; and being afterwards asked how she knew there were strangers in the room, she answered, by the smell.

"But though she could by this sense distinguish in general between persons with whom she was well acquainted, and strangers, yet she could not so easily distinguish one of her acquaintance from another without other assistance. She generally distinguished her friends by feeling their hands; and when they came in, they used to present their hands to her, as a mean of making themselves known: the make and warmth of the hand produced in general the differences that she distinguished; but sometimes she used to span the wrist, and measure the fingers. A lady, with whom she was very well acquainted, coming in one very hot day, after

having walked a mile, presented her hand, as usual; she felt it longer than ordinary, and seemed to doubt whose it was; but after spanning the wrist, and measuring the fingers, she said, 'It is Mrs M. but she is warmer to-day than ever I felt her before.'

"To amuse herself in the mournful and perpetual solitude and darkness to which her disorder had reduced her, she used to work much at her needle; and it is remarkable, that her needle-work was uncommonly neat and exact: among many other pieces of her work that are preserved in the family, is a pin-cushion, which can scarce be equalled. She used also sometimes to write; and her writing was yet more extraordinary than her needle-work: it was executed with the same regularity and exactness; the character was very pretty, the lines were all even, and the letters placed at equal distances from each other: but the most astonishing particular of all, with respect to her writing, is, that she could by some means discover when a letter had by some mistake been omitted, and would place it over that part of the word where it should have been inserted, with a caret under it. It was her custom to sit up in bed at any hour of the night, either to write or to work, when her pain or any other cause kept her awake.

"These circumstances were so very extraordinary, that it was long doubted whether she had not some faint remains both of hearing and sight, and many experiments were made to ascertain the matter; some of these experiments she accidentally discovered, and the discovery always threw her into violent convulsions. The thought of being suspected of insincerity, or supposed capable of acting so wicked a part as to feign infirmities that were not inflicted, was an addition to her misery which she could not bear, and which never failed to produce an agony of mind not less visible than those of her body. A clergyman who found her one evening at work by a table with a candle upon it, put his hat between her eyes and the candle, in such a manner that it was impossible she could receive any benefit from the light of it if she had not been blind. She continued still at her work, with great tranquillity; till, putting up her hand suddenly to rub her forehead, she struck it against the hat, and discovered what was doing; upon which she was thrown into violent convulsions, and was not without great difficulty recovered. The family were, by these experiments, and by several accidental circumstances, fully convinced that she was totally deaf and blind; particularly by sitting unconcerned at her work, during a dreadful storm of thunder and lightning, though she was then facing the window, and always used to be much terrified in such circumstances. But Sir Hans Sloane, her physician, being still doubtful of the truth of facts which were scarce less than miraculous, he was permitted to satisfy himself by such experiments and observations as he thought proper; the issue of which was, that he pronounced her to be absolutely deaf and blind.

"She was at length sent to Bath, where she was in some measure relieved; her convulsions being less frequent, and her pains less acute: but she never recovered her speech, her sight, or her hearing in the least degree.

"Many of the letters dated at Bath, in some of which there are instances of interlineations with a caret, the writer of this narrative hath seen, and they are now

Blind.

in the custody of the widow of one of her brothers, who, with many other persons, can support the facts here related, however wonderful, with such evidence as it would not only be injurious, but folly, to disbelieve."

An account of a French lady, blind from her infancy, who can read, write, and play at cards, &c. "A young gentlewoman of a good family in France, now in her 18th year †, lost her sight when only two years old, her mother having been advised to lay some pigeons blood on her eyes, to preserve them in the small-pox; whereas, so far from answering the end, it eat into them. Nature, however, may be said to have compensated for the unhappy mistake, by beauty of person, sweetness of temper, vivacity of genius, quickness of conception, and many talents which certainly much alleviate her misfortune.

"She plays at cards with the same readiness as others of the party. She first prepares the packs allotted to her, by pricking them in several parts; yet so imperceptibly, that the closest inspection can scarce discern her indexes. She sorts the suits, and arranges the cards in their proper sequence, with the same precision, and nearly the same facility, as they who have their sight. All she requires of those who play with her, is to name every card as it is played; and these she retains so exactly, that she frequently performs some notable strokes such as shew a great combination and strong memory.

"The most wonderful circumstance is, that she should have learned to read and write; but even this is readily believed on knowing her method. In writing to her, no ink is used, but the letters are pricked down on the paper; and by the delicacy of her touch, feeling each letter she follows them successively, and reads every word with her fingers ends. She herself in writing makes use of a pencil, as she could not know when her pen was dry; her guide on the paper is a small thin ruler and of the breadth of her writing. On finishing a letter, she wets it, so as to fix the traces of her pencil, that they are not obscured or effaced; then proceeds to fold and seal it, and write the direction: all by her own address, and without the assistance of any other person. Her writing is very straight, well cut, and the spelling no less correct. To reach this singular mechanism, the indefatigable cares of her affectionate mother were long employed, who accustomed her daughter to feel letters cut in cards or paste-board, brought her to distinguish an A from a B, and thus the whole alphabet, and afterwards to spell words; then, by the remembrance of the shape of the letters, to delineate them on paper; and, lastly, to arrange them so as to form words and sentences.

"She has learned to play on the guitar, and has even contrived a way of pricking down the tunes as an assistance to her memory. So delicate are her organs, that in singing a tune, though new to her, she is able to name the notes.

"In figured dances she acquits herself extremely well, and in a minuet with inimitable ease and gracefulness. As for the works of her sex, she has a masterly hand; she sews and hems perfectly well; and in all her works she threads the needles for herself however small.

"By the watch her touch never fails telling her exactly the hour and minute."

From this account, however, it would appear, that except reading and writing, the French lady has nothing to boast of in which she is not excelled by Mr Stanley already mentioned, if we may credit all that is reported of him. The works peculiar to her sex are gained mechanically; but the *distinguishing colours*, telling the precise time by a watch, naming the notes in music, and many other things depending upon the ear and touch, are said to be so familiar to him, that his friends cease to think them extraordinary. Attainments still more wonderful are ascribed to him; as, the naming the number of persons in a room on entering it; the directing his voice to each person in particular, even to strangers when they have once spoken; the missing any person absent, and telling who that person is; and lastly, his being able to form just conceptions of youth, beauty, symmetry, and shape.

Pore-Blind, or *Pur-blind*. A person who is very short-sighted is said to be *pur-blind*.

Moon-Blind, denotes horses that lose their sight at certain times of the moon *.

Blind-Worm. See *ANGUIS*.

BLINDS, or **BLINDES**, in the art of war, a sort of defence commonly made of ozers, or branches interwoven, and laid across between two rows of stakes, about the height of a man, and four or five feet asunder, used particularly at the heads of trenches, when they are extended in front towards the glacis; serving to shelter the workmen, and prevent their being overlooked by the enemy.

BLINDNESS, a total privation of sight, arising from an obstruction of the functions of the organs of sight, or from an entire deprivation of them †.

BLISTER, in medicine, a thin bladder containing a watery humour, whether occasioned by burns, and the like accidents, or by vesicatories applied to different parts of the body for that purpose *.—*Cantharides*, or Spanish flies, applied in the form of a plaster, are chiefly used with this intention. See *CANTHARIDES*.

BLITE, in botany. See *BLITUM*.

BLITH, a town of Nottinghamshire, in England, seated in W. Long. o. 55. N. Lat. 53. 25.

BLITUM, **BLITE**, or *Strawberry Spinach*; a genus of the digynia order, belonging to the monandria class of plants.

Species. 1. The capitatum, with flowers in clustered heads at the joints and crown of the stalks, is a native of Spain and Portugal, but has been long preserved in the British gardens on account of the beauty of its fruit. It is an annual plant, with leaves somewhat like those of spinach; the stalk rises two feet and an half high; the upper part of the stalk hath flowers coming out in small heads at every joint, and is terminated by a little cluster of the same: after the flowers are past, the heads swell to the size of wood strawberries, and when ripe have the same appearance, but are not eatable: they are full of a purple juice, which stains the hands of those who bruise them of a deep purple colour.

2. The *virgatum*, with small heads growing from the sides of the stalks, is a native of the south of France and Italy. This seldom grows more than a foot high: the leaves are smaller than the first, but of the same shape: the flowers are produced at the wings of the leaves, almost the length of the stalk; they are smaller and not so deeply coloured as the first. 3. The *tartaricum*,

ricum, triangular, acutely indented leaves, is a native of the country from which it takes its name. Mr Miller received the seeds from Peterburg. It rises to very near three feet high; the flowers come out from the sides of the stalks, but are smaller than those of the first, as is also the fruit.

Culture. All these plants, being annuals, must be propagated by seeds; and, as they are very hardy, will succeed in the common borders, if sown in March or April, covering the seed about half an inch deep with earth, and leaving the plants five or six inches asunder. When they come up, each must be supported with a small stick, or they will be borne down by the weight of the berries.

BLOATING, among physicians. See EMPHYSEMA.

BLOCK, a large mass of wood, serving to work or cut things on.

Mounting Block, an eminence usually of stone, cut in steps or notches, serving as a help to mount on horseback. These were much in use among the ancients, who were unacquainted with stirrups. The Romans erected them at proper stations along all their great roads.

BLOCKADE, in the art of war, the blocking up a place, by posting troops at all the avenues leading to it, to keep supplies of men and provisions from getting into it; and by these means proposing to starve it out, without making any regular attacks.

To *raise a blockade*, is to force the troops that keep the place blocked up from their posts.

BLOCCZIL, a fortress of Over-ysel in the United Provinces, seated on the river Aa, at the place where it falls into the Zuider Zee. It has a port sufficient to contain 200 vessels, and serves to defend those ships that cross this sea. It has six good bastions, and several other regular fortifications. E. Long. 6. o. N. Lat. 52. 44.

BLOEMART (Abraham), a celebrated painter, born at Gorcum in Holland in 1567. We are not informed what particular means of improvement he had; but it is certain he designed in a more elegant taste than any of his countrymen. His figures are often graceful; excepting only that he gives them sometimes an affected twist, which is still more conspicuous in the fingers. The resurrection of Lazarus is one of Bloemart's master-pieces; in which are many faults, and many beauties; both very characteristic. There have been a great number of prints engraved after his works. He died in 1647; and left three sons: two of them, Henry and Adrian, were painters; and the youngest, Cornelius, was an excellent engraver.

BLOIS, a town of France, the capital of Blaisois, in Orleans, is seated on the banks of the river Loire, partly on a plain, and partly on an eminence, in the midst of one of the most agreeable countries of France. The castle is the ornament of this city. At the first view, it seems to be two distinct buildings; but it is joined by a passage cut out of the rock. Joining to this, on the west-side, is the tower of *Chateau-Rognand*, so called because that lordship may be discovered from hence, though 20 miles distant. At the east-end of this is another small tower, which is partly ancient and partly modern. That part of the castle which was built by the duke of Orleans, in the room of that

which he demolished in 1632, is a superb edifice, but unfinished. The court before it, where the church of St Saviour is built, is very large, and was formerly used for tournaments. The most remarkable thing in this castle is a fine long gallery, adorned with many curious and uncommon pieces; it is in the midst of two gardens, one of which is full of fruit-trees, and the other of parterres, fountains, cascades, and marble statues brought from Italy. Beyond these, there is a large park, where there is game in abundance. On all the gates of the city there is the image of the Virgin Mary, who they believe freed them from the plague in 1631. There are several parish-churches, chapters, and religious houses for both sexes. The church of St Solenne is the cathedral, and is the handsomest in the city. The front of the Jesuits church is decorated with three orders of architecture, the Doric, Ionic, and Corinthian; but there is only the Doric on the inside. The town-house is a tolerable building, and stands in a street which terminates at the quay, where there is a public walk that has a fine prospect on the Loire, over which there is a bridge that leads to the suburbs of Vienna. There are a few houses on the bridge, and a tower at each end to guard the entrance. About three quarters of a mile from the city, the water runs down the clefts of a rock into a large aqueduct, by which it is conveyed to a reservoir near the walls, and from hence distributed by leaden pipes to the several parts of the city. The country about Blois produces corn, wine, cattle, and game of every kind, and the waters a great quantity of fish. The meadows are so rich and fertile, that the cows yield excellent milk, good in consumptive cases, and which affords the best cream in the kingdom. About a league from Blois, there are mineral springs, which have the same virtues as those of Forges. The trade of Blois is chiefly in wine and brandy; but they also make some ferges and stuffs at this place. Several kings have kept their courts at Blois, for which reason they speak the French language in perfection, and the inhabitants are accounted witty and polite. E. Long. 1. 30. N. Lat. 47. 35.

BLOMARY, or **BLOOMARY**, in metallurgy, the first forge through which iron passes, after it is melted out of the ore.

BLON (James Christopher le), an artist who invented a method of producing paintings by printing. He was a Frenchman of surprising vivacity and volubility; and Mr Walpole, who knew him, says, he had a head admirably mechanic, but was an universal projector. His method of printing paintings was performed by several mezzotint plates for one piece, each expressing different shades and parts of the piece in different colours. In this manner he perfected many large pictures that were very tolerable copies of the best masters. He distributed those by a kind of lottery, but the subscribers did not find their prizes much valued. However, some heads coloured progressively, according to their several gradations, bear witness to the success and beauty of his invention. He had another merit to the public, with which few inventors begin; for he communicated his secret in a thin quarto, entitled *Coloritto*, or "The harmony of colouring in painting, reduced to mechanical practice, under easy precepts and infallible rules." In 1732, he also published,

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in French, a Treatise on ideal Beauty, which has been since translated into English; he afterwards set up a project for copying the cartoons in tapestry, and made some very fine drawings for that purpose, but did not meet with the success he expected. The affair therefore was dropped, and he disappeared.

BLONDEL (David), a protestant minister in the 17th century, distinguished by his skill in ecclesiastical and civil history, was born at Chalons sur Marne; and was admitted minister at a synod of the isle of France, in 1614. He wrote, 1. A defence of the reformed churches of France. 2. A work against the decretal epistles. 3. *De Episcopis & Presbyteris*; and other pieces. Bayle informs us that he had a very singular way of studying; he lay on the ground, and had round about him the books which he wanted for the work he was about. He died in 1655, aged 64.

BLONDEL (Francis), regius professor of mathematics and architecture, was employed in several negotiations, arrived at the dignity of marshal de camp and counsellor of state, and had the honour of being chosen to teach the dauphin the mathematics; he was also made member of the Academy of Sciences at Paris, and director of the Academy of Architecture. He died at Paris in 1688, aged 68. He wrote, 1. Notes on the architecture of Savot. 2. A course of architecture and mathematics. 3. The art of throwing bombs. 4. A new manner of fortifying places. 5. A comparison between Pindar and Horace; and other works.

BLONDUS (Flavius), an historian born at Forlì, in Italy, in 1388, was secretary to Eugenius IV. and other popes. He composed a great many books; and, among others, a History from the year 400 to 1440. He died in 1463.

BLONIEZ, a town of Poland, in the province of Warovia. E. Long. 20. 35. N. Lat. 52. 0.

BLOOD, a red liquor circulating through the vessels of the human body and the bodies of the larger animals, which appears immediately and essentially necessary to the preservation of life.

Though there is no living creature as yet known, whose life does not immediately depend upon the circulation of some kind of fluid through its vessels, yet unless such fluid is of a red colour, it doth not obtain the name of *blood*; and therefore such creatures as have a colourless or milky liquor circulating through their vessels, are called *exsanguious animals*.

The blood has a very different degree of thicknes or viscosity in different animals, and even in the same animal at different times. Though it is in all cases endowed with a considerable degree of tenacity, yet in strong animals that tenacity is remarkably greater than in weak ones; and hence the blood of bulls was made use of by the ancients as a poison, its extreme viscosity rendering it totally indigestible by the powers of the human stomach. It is well known also by physicians, that there are some states of the human body in which the blood becomes vastly tenacious, so as in a great measure to refuse any intimate connection with water; and others, in which its crasis is almost totally dissolved, so as to appear, when drawn out of the body, like a fluid and half putrid mafs *.

The common appearance of the blood when drawn from a vein in the human body is well known. It first seems an homogeneous red liquor; then it consolidates

into one uniform mafs; in a little time, a yellowish watery liquor begins to separate from it, which is more or less in quantity according to the state in which the blood happens to be; the red mafs, in the mean time, contracts greatly in its dimensions, and increases in solidity. But this increase of solidity is likewise proportional to the state of the blood at the time: in strong people, if attacked with a violent inflammatory disease, the solid part is exceedingly tough, inasmuch that Dr Huxham says he has sometimes found it almost like a piece of flesh itself; whereas, in other diseases, the solid part is very soft and tender, breaking in pieces with the slightest touch. The spontaneous separation of the blood into crassamentum, serum, and coagulable lymph, hath been already taken notice of under ANATOMY, n^o 389.

The attention of physiologists hath been very much engaged by inquiries into the nature and composition of the blood, and accordingly it hath been examined in all possible ways. By a chemical analysis, it discovers the same principles with other animal substances; giving over in distillation a great quantity of phlegm, a volatile spirit, with much fetid oil; after which, there remains a charred matter, that, burnt in an open fire, leaves a white earth similar to calcined hartshorn. Some eminent chemists, Mr Homberg particularly, have asserted that blood contains an acid as well as an alkali, but that the former doth not arise till towards the end of the distillation: but what is very singular, and indeed must throw no small suspicion on the whole account, is, that the acid and alkali, notwithstanding their great tendency on all other occasions to unite with each other, do here remain separate, so that the liquor may be even redistilled without their forming any neutral compound. An experiment in confirmation of this is recorded in the memoirs of the Royal Academy for 1712. Six pounds of human blood distilled to dryness with a gentle heat, were reduced to a pound and an half; after which, the mafs was urged with a graduated fire, till the retort at last became red hot. The produce was 17 ounces of liquor; 12 of which were a red and very empyreumatic volatile spirit, the other five were oil. The caput mortuum was a light coal weighing four ounces and a half. On rectifying the volatile spirit in a small retort, about an ounce of a red fetid liquor remained, which had a very acid smell, and turned the juice of turnsole red. Mr Homberg now imagined, that the acid contained in the blood of animals could not disengage itself perfectly by these distillations without addition. He therefore determined to distil human blood with an admixture of some other substance; but as earths contain a salt, which might render the operation uncertain, he determined to use only the caput mortuum of a former distillation of the same substance. For this purpose, four pounds of the coagulum of human blood being well mixed with a large quantity of this residuum, and the whole dried in the sun, it was put into a retort, and distilled with a fire raised, towards the end of the operation, to the utmost violence. The oil being separated from the volatile spirit, the latter was rectified; and the consequence was, that there came over four pounds of a red acid liquor, that turned the tincture of turnsole very red. All the distillations of the aqueous liquors already mentioned, obtained by similar processes, being mixed together, and separated from their yet remaining

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No animal
without
some liquor
equivalent
to blood.

2
Blood of
different
thickness in
different animals.

3
That of
bulls an-
ciently used
as a poison.

* See the
Index sub-
joined to
Medicine.

4
Appearance
of the blood
when drawn
from a vein.

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Blood
microscopicallyContains
an acid,
according
to some
chemists.Experiment
in confirmation
of this

maining oil, by careful dilution with water and filtration, they were at length distilled together; the liquor that came over was clear as water, and its first quantities contained a great deal of volatile salt, but the last two ounces were found to be as four as distilled vinegar.—The same products were obtained from the blood of carnivorous animals, as well as from that of animals feeding solely upon vegetables.

In Dr Lewis's notes on Newman's Chemistry we have the following account of the blood, and the parts into which it may be resolved. "Recent blood is equally fluid, and in taste somewhat saline. Viewed by a microscope, it appears composed of numerous red globules swimming in a transparent fluid. On standing for a little time, it separates into a thick crassamentum, and fluid serum. By agitation, it continues fluid: A consistent polypous matter adheres to the stirrer, which, by repeated ablation with water, becomes white.—Received from the vein in warm water, it deposits a quantity of transparent filamentous matter, the red portion continuing dissolved in the water. On evaporating the fluid, a red powdery substance is left.—It congeals by frost, and becomes fluid again by warmth; after liquefaction, it quickly putrefies.—Fluid and florid blood exposed to a temperate air, putrefies sooner than such as is more dense. Impurified to dryness, it leaves a dark-coloured mass, amounting, at a medium, to about one fourth of the weight of the blood, of a bitter saline taste, easily inflammable, burning with a bluish flame. The exsiccated blood is not soluble in acid or alkaline liquors; but gives some tincture to water and to spirit of wine, and is more powerfully acted upon by dulcified spirit of nitre. Recent blood is coagulated by the mineral acids, and by most of the combinations of them with earthy and metallic bodies. With vegetable acids, and with solutions of neutral salts, it mingles equally without coagulation. Alcalis, both fixed and volatile, render it more fluid, and preserve it from coagulating.

"The serum of blood is more saline than the crassamentum, and does not so speedily putrefy. It freezes somewhat more difficultly than pure water; and its aqueous part evaporates, by a gentle warmth, somewhat more readily, leaving about one twelfth of the weight of the serum of a solid yellowish pellucid matter. Exposed to heat a little greater than that of the human body, it coagulates into a solid mass, without any considerable evaporation. Both this coagulum and the impurified serum are readily inflammable in the fire, not dissoluble in water, or in spirit of wine, in acid or in alkaline liquors."

But the texture of the blood discoverable by a microscope, hath engaged the attention of the learned much more than the chemical analysis ever did. Lewenhoeck was the first who discovered, or fancied he discovered, that the blood, as it exists in the body of an animal, consists of a quantity of red globular particles swimming in a large quantity of transparent liquor. Each of these globules, he imagined, was composed of six smaller ones packed together. While the six continued to adhere, their colour was red; but when separated, they became yellow, and thus formed what is called the *serum*. He even pretended to have discovered that each of the serous globules consisted of six smaller ones, and that these when broken down constituted some

more subtle and penetrating liquor than the serum, &c. This was for a long time received almost universally as an undoubted fact; and many theories were built upon it, and elaborate calculations made, of which (we hope) no account needs now be given, as the falsity of these pretended discoveries is generally allowed. Father de Torre, with microscopes which he pretended were capable of magnifying to an incredible degree, found that the red particles of the blood were of an annular figure, with a perforation in the middle; and that the ring itself was formed of several joints. Some of these extraordinary magnifiers, however, being sent over to England, those who were appointed by the Royal Society to make trial of them found them totally useless, so that the credit of Father de Torre's discoveries must have rested principally on his own evidence. The falsity of his hypothesis, as well as that of Lewenhoeck, was detected by the late Mr Hewson, whose microscopical experiments on the blood being the latest that have appeared, we shall transcribe the following particular account of them given by himself in a letter to Dr Haygarth physician in Chester.—"The red particles of the blood, improperly called *globules*, are flat in all animals, and of very different sizes in different animals. In man they are small, as flat as a shilling, and appear to have a dark spot in the middle. In order to see them distinctly, I dilute the blood with fresh serum. My predecessors, not having thought of this, could not see them distinctly. And Lewenhoeck in particular, imagining a round figure fittest for motion, concluded they must be round in the human body; though he and others allowed that in frogs, &c. where they viewed them distinctly from the blood being thinner, they were flat. Now I prove that they are flat in all animals. In the human blood, where these particles are small, it is difficult to determine what that black spot is which appears in the centre of each. Some have concluded that it was a perforation: but in a frog, where it is six times as large as in a man, it is easy to show that it is not a perforation, but on the contrary is a little solid, which is contained in the middle of a vesicle. Instead, therefore, of calling this part of the blood red *globules*, I should call it red *vesicles*; for each particle is a flat vesicle, with a little solid sphere in its centre.

"I find that the blood of all animals contains vesicles of this sort. In human blood there are millions of them; and they give it the red colour. But in insects they are white, and less numerous in proportion than in man and quadrupeds. As they are flat in all animals, I suspect that shape is a circumstance of importance, but can be altered by a mixture with different fluids. And I find that it is by a determinate quantity of neutral salt contained in the serum, that this fluid is adapted to preserving these vesicles in their flat shape: for, if they be mixed with water, they become round, and dissolve perfectly; but add a little of any neutral salt to the water, and they remain in it, without any alteration in their shape, and without dissolving.

"Now, when it is considered, that the blood of all animals is filled with these particles, we must believe that they serve some very important purpose in the animal economy; and since they are so complicated in their structure, it is improbable they should be made by mechanical agitation in the lungs or blood-vessels,

Blood.

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According
to Father de
Torre.

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According
to Mr Hew-
son.

Blood.

as has been suspected, but probably have some organs set apart for their formation. This I shall endeavour to prove, when I have explained their structure a little more particularly, and mentioned the manner in which I exhibit it. I take the blood of a toad or frog, in which they are very large; I mix it with the serum of human blood to dilute it; I find them appear all flat; so they do in the blood-vessels of this animal, as I have distinctly seen in the web between its toes, whilst the animal was alive and fixed in the microscope. Their appearance in these animals is not unlike slices of cucumber. I next mix a little of the blood with water, which immediately makes them all round, and then begins to dissolve them whilst they are round. I incline the stage of the microscope, so as to make them roll down it; and then I can distinctly see the solid in the middle fall from side to side like a pea in a bladder. A neutral salt added to them at this time brings them back to their flat shape: but if the salt be not added, the water gradually dissolves away the vesicle; and then the little sphere is left naked. Such is the composition of these particles. I have exhibited these experiments to a considerable number of my acquaintance, who all agree in their being satisfactory.

"The microscope I use is a single lens, and therefore as little likely to deceive us as a pair of spectacles, which, as is allowed by all who use them, do not disfigure objects, but only represent them larger.

"From farther experiments, I am convinced, that the use of the thymus and lymphatic glands is to make the middle solid pieces: and I can prove it in as satisfactory a manner as you can do the use of any viscus in the human body; that is, by opening these glands, and examining the fluid contained in their cells, which I find to be full of these little solids. I moreover find, that the lymphatic vessels take them up from those glands, and convey them into the blood-vessels which carry them to the spleen, in whose cells they have the vesicles laid over them; so that the thymus and lymphatic glands make the central particles, and the spleen makes the vesicles that surround them. That this is the use of the spleen appears from examining the lymph which is returned from it by its lymphatic vessels; for that lymph, contrary to what is observed in other parts of the body, is extremely red.

"But besides having these glands set apart for making the red vesicles of the blood, I find that they are also made in the lymphatic vessels in different parts of the body, whose coats have blood-vessels properly constructed for this secretion. So that the thymus and lymphatic glands are no more than appendages of the lymphatic system, for making the middle particles; and the spleen an appendage to the lymphatic vessels, for making the vesicles which contain these middle particles.

"I conjecture that it is the coagulable lymph which is converted into this red part of the blood, from a curious fact that has long been known; namely, that the blood in the splenic vein does not coagulate when exposed to the air, as the blood of other veins does; so that it seems to be robbed of its coagulable lymph in passing through the spleen.

"It is very remarkable, that the spleen can be cut out of an animal, and the animal do well without it. I made the experiment on a dog, and kept him a year

and a half without observing his health to be in the least impaired. From this some have concluded the spleen to be an useless weight; which is absurd, when we consider that all animals with red blood have it. Therefore it is more consistent with what we know of the animal economy, to conclude, that since an animal can do well without it, there is probably some part of the body that can supply its place.

"Infects have vesicles constructed in a similar way to ours, but differing in colour. But insects have neither spleen, thymus, nor lymphatic glands; and therefore in them probably these vesicles are entirely fabricated in the lymphatic vessels. But to us, and other of the more perfect animals, besides the lymphatic vessels, nature has given those glands, that a proper quantity of those important vesicles might be the better secured to us; just as she has given us two ears, the better to secure us hearing through life, though we can hear perfectly well with one."

This letter, we apprehend, contains the strength of Mr Hewson's evidence for his hypothesis; on which we shall only remark, that if the red globules are prepared in the manner above mentioned, and the lymphatic vessels are excretories of those glands where the red particles are formed; then if there is any vessel where all these excretories unite, as mentioned ANATOMY, n° 370, in that vessel the lymph ought to appear very red, on account of the accumulated quantity of red vesicles brought thither from all parts of the body. But no such redness seems ever to have been taken notice of by any anatomist: this therefore must be an objection to Mr Hewson's hypothesis; and such an one, perhaps, as will not be easily removed.

Many other hypotheses have been invented concerning the formation of the red blood, and various opinions delivered concerning its red colour. In a lecture delivered at Newcastle in 1773, by Dr Wilson of that place, he asserts "that it is self-evidently the office of the "veins to elaborate the fluids into that form and composition which we know by the name of red blood." The self-evidence here, however, is by no means apparent to us; nor doth he at all point it out in an intelligible manner.—Dr Cullen, in his physiological part of The Institutions of Medicine, acknowledges that we know but little of the formation of any of the animal fluids; and concerning the microscopical observations, &c. on the blood gives his opinion in the following words, § ccliv. "The red globules have been considered as an oily matter, and from thence their distinct and globular appearance has been accounted for: but there is no direct proof of their oily nature; and their ready union with, and diffusibility in, water, renders it very improbable. As being microscopical objects only, they have been represented by different persons very differently. Some have thought them spherical bodies, but divisible into six parts, each of which in their separate state were also spherical; but other persons have not observed them to be thus divisible. To many observers they have appeared as perfectly spherical; while others judge them to be oblate spheroids, or lenticular. To some they have appeared as annular, and to others as containing a hollow vesicle. All this, with several other circumstances relating to them, very variously represented, shew some uncertainty in microscopical observations; and it leaves me, who am not

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converfant in fuch obfervations, altogether uncertain with refpect to the precise nature of this part of the blood. The chemical hiftory of it is equally precarious; and therefore what has been hitherto faid of the production and changes happening to thefe red globules, we chufe to leave untouched.—We fuppofe that the red globules, when viewed fingly, have very little colour; and that it is only when a certain number of them are laid upon one another, that the colour appears of a bright red: but this alfo hath its limits; fo that when the number of globules laid on one another is confiderable, the colour becomes of a darker red. Upon this fuppofition, the colour of the mafs of blood will be brighter or darker as the colouring part is more or lefs diffufed among the other parts of the mafs; and we think this appears to be truly the cafe from every circumftance that attends the changes which have been at any time obferved in the colour of the blood.”

Concerning the uncertainty of microfcopical, as well as chemical experiments, we fhall not difpute; though the conclufion againft them feems carried too far. But with regard to the colour of the blood, we apprehend it hath been known, almoft, if not altogether, fince the difcovery of the circulation, that the florid or dark colour depends on the prefence or abfence of air, and not upon any number of globules.—Thus the blood returning from the veins is of a dark colour. Though diluted with the frefh chyle from the fubclavian vein, it continues of the fame dark colour till it paffes thro’ the lungs, upon which it instantly affumes a very florid red; but it can never be proved that the globules in the pulmonary vein are at all lefs numerous than in the pulmonary artery.—That this change of colour may be effected by the air through membranes much thicker than we can fuppofe the veffels of the lungs to be, hath been demonftrated by Dr Priestley’s experiments mentioned under the article AIR, n° 47, 48. but whether the change is occafioned by the mere feparation of phlogifton from the blood, or by the abforption of fome other principle in its ftead, is not yet determined, or indeed inquired into, as far as we have heard.

This leads us to confider the ufes to which the blood is fubfervient in the animal œconomy, and the changes that happen to it in refpiration. The ufes of this fluid are fo various, and of fuch an important nature, that fome have not fcrupled to affirm the blood to be actually poffeffed of a living principle, and that the life of the whole body is derived from it. This opinion was firft broached by the celebrated Harvey, the difcoverer of the circulation: but in this he was never much followed; and the hypothesis itfelf, indeed, has been pretty much laid afide and neglected, till of late that it was revived by Dr J. Hunter, profeflor of anatomy in London. This gentleman fupports his opinion by the following arguments: 1. The blood unites living parts, in fome circumftances, as certainly as the yet recent juices of the branch of one tree unite it with that of another. Were either of thefe fluids to be confidered as extraneous or dead matters, he thinks they would act as ftimuli, and no union would take place in the animal or vegetable kingdom. This argument, Mr Hunter imagines, is ftill farther eftablifhed by the following experiment. Having taking off the tefticle from a living cock, he introduced it into the belly of a living hen. Many weeks afterwards, upon injecting

the liver of the hen, he injected the tefticle of the cock; which had come in contact with the liver, and adhered to it. He alleges, that, in the nature of things, there is not a more intimate connection between life and a folid, than between life and a fluid. For, although we are more accuftomed to connect it with the one than the other, yet the only real difference which can be fhewn between a folid and a fluid is, that the particles of the one are lefs moveable among themfelves than thofe of the other. Befides, we often fee the fame body fluid in one cafe, and folid in another. 2. The blood becomes vafcular like other living parts. Mr Hunter affirms, that, after amputations, the coagula in the extremities of arteries may be injected by injecting thefe arteries; and he has a preparation in which he thinks he can demonftrate veffels rifing from the centre of what had been a coagulum of blood, and opening into the fream of the circulating blood. 3. Blood taken from the arm in the moft intense cold which the human body can bear, raifes the thermometer to the fame height as blood taken in the moft fultry heat. This he confiders as a ftrong proof of the blood’s being alive; as living bodies alone have the power of refifting great degrees both of heat and cold, and of maintaining in almoft every fituation, while in health, that temperature which we diftinguifh by the name of *animal heat*. 4. Blood is capable of being acted upon by a ftimulus. In proof of this, he obferves, that it coagulates from expofure, as certainly as the cavities of the abdomen and thorax inflame from the fame caufe. The more it is alive, that is, the more the animal is in health, it coagulates the fooner on expofure; and the more it has loft of its living principle, as in the cafe of violent inflammations, the lefs it is fenfible to the ftimulus produced from its being expofed, and it coagulates the later. 5. The blood preserves life in different parts of the body. When the nerves going to a part are tied or cut, the part becomes paralytic, and lofes all power of motion; but it does not mortify. If the artery be cut, the part dies, and mortification enfues. What keeps it alive in the firft cafe? Mr Hunter believes it is the living principle which alone can keep it alive; and he thinks that this phenomenon is inexplicable on any other fuppofition, than that life is fupported by the blood. 6. Another argument he draws from a cafe of a fractured os humeri he had occafion to obferve. A man was brought into St George’s-hofpital for a fracture of the os humeri, and died about a month after the accident. As the bones had not united, Mr Hunter injected the arm after death. He found that the cavity between the extremities of the bones was filled up with blood which had coagulated. This blood was become vafcular. In fome places it was very much fo. He does not maintain that all coagulated blood becomes vafcular: and indeed the reafon is obvious; for it is often thrown out and coagulated in parts where its becoming vafcular could anfwer no end in the fyftem; as, for example, in the cavities of aneurifmal facs. If it be fuppofed, that, in fuch cafes as that juft now mentioned, the veffels are not formed in the coagulum, but come from the neighbouring arteries, he thinks it equally an argument that the blood is alive; for the fubftance into which veffels fhoot mult be fo. The very idea, that fuch a quantity of dead matter as the whole mafs of blood, circulates in a living body, appears to

Blood. him absurd.

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The system which at present stands opposed to that of Dr Hunter, considers the brain and nervous system as the fountain of life; and that, so far from receiving its life from the blood, the nervous system is capable of instantaneously changing the crasis of the blood, or any other animal fluid; and though the nervous system cannot continue its actions for any length of time if the action of the blood-vessels is suspended, yet the heart and blood-vessels cannot act for a single moment without the influence of the nervous fluid. Hence, say they, it is plain we must suppose the nervous system, and not the blood, to contain properly the life of the animal, and consequently to be the principal vital organ. The secretion of the vital fluid from the blood by means of the brain, is, by the supporters of this hypothesis, denied. They say, that any fluid secreted from the blood must be aqueous, inelastic, and inactive; whereas the nervous fluid is full of vigour, elastic, and volatile in the highest degree. The great necessity for the circulation of the blood through all parts of the body, notwithstanding the presence of the nervous fluid in the same parts, they say, is, because some degree of tension is necessary to be given to the fibres, in order to fit them for the influx of the nervous fluid; and this tension they receive from the repletion of the blood-vessels, which are every where dispersed along with the nerves.

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Decisive ar-
guments in
favour of
Dr Hunter's
opinion.

To follow this dispute through every argument that hath been, or that may be, used by both parties, would prove tedious, and to us appears in a great measure unnecessary, as the following short considerations seem to decide the matter absolutely against the patrons of the nervous system. In the first place, then, if we can prove the life of the human body to have existed in, or to have been communicated from a fluid to the nervous system, the analogical argument will be very strongly in favour of the supposition that the case is so still. Now, that the case once was so, is most evident; for the human body, as well as the body of every other living creature, in its first state, is well known to be a gelatinous mass, without muscles, nerves, or blood-vessels. Nevertheless, this gelatinous matter, even at that time, contained the nervous fluid. Of this there can be no doubt, because the nerves were formed out of it, and had their power originally from it; and what is remarkable, the brain is observed to be that part of the animal which is first formed. Of this gelatinous fluid we can give no other account, than that it was the nutritious matter from which the whole body appears to be formed. At the original formation of man, and other animals, therefore, the nutritious matter was the substratum of the whole body consisting of muscles, nerves blood-vessels, &c. nay more, it was the immediate efficient cause of the nervous power itself. Why should it not be so now, as well as then? Again, in the formation of the embryo, we see a vital principle existing as it were at large, and forming to itself a kind of regulator to its own motions, or a habitation in which it chooses to reside, rather than to act at random in the fluid. This habitation, or regulator, was undoubtedly the nervous system, and continues so to this moment; but at the same time, it is no less evident that a nutritious fluid was the immediate origin of these same nerves, and of that very nervous fluid. Now we know, that the fluid which in the womb nourishes the bodies of all em-

bryo animals, is necessarily equivalent to the blood which nourishes the bodies of adult ones; and consequently, as soon as the blood became the only nutritious juice of the body, at that same time the vital or nervous fluid took up its residence there, and from the blood diffused itself along the nerves, where it was regulated exactly according to the model originally formed in the embryo. Perhaps it may be said, that the vital power, when once it hath taken possession of the human or any other body, requires no addition or supply, but continues there in the same quantity from first to last. If we suppose the nervous power to be immaterial, this will indeed be the case, and there is an end of reasoning upon the subject; but if we call this power a volatile and elastic fluid, it is plain that there will be more occasion for recruits to such a power than to any other fluid of the body, as its volatility and elasticity will promote its escape in great quantities through every part of the body. It may also be objected, that it is absurd to suppose any fluid, or mechanical cause, capable of putting matter in such a form as to direct its own motions in a particular way; but even of this we have a positive proof in the case of the electric fluid. For if any quantity of this matter hath a tendency to go from one place to another where it meets with difficulty, thro' the air, for instance, it will throw small conducting substances before it, in order to facilitate its progress. Also, if a number of small and light conducting substances are laid between two metallic bodies, so as to form a circle, for example; a shock of electricity will destroy that circle, and place the small conducting substances nearer to a straight line between the two metals, as if the fluid knew there was a shorter passage, and resolved to take that, if it should have occasion to return*. Lastly, it is universally allowed, that the brain is a secretory organ, made up of an infinite number of small glands, which have no other excretories than the medullary fibres and nerves. As a considerable quantity of blood is carried to the brain, and the minute arteries end in these small glands, it follows, that the fluid, whatever it is, must come from the blood. Now, there is no gland whatever, in the human, or any other body, but will discharge the fluid it is appointed to secrete, in very considerable quantity, if its excretory is cut. Upon the cutting of a nerve, therefore, the fluid secreted by the brain ought to be discharged; but no such discharge is visible. This makes it plain, even to demonstration, that the fluid secreted in the brain is *invisible* in its nature; and as we know the nervous fluid hath its residence in the brain, it is very probable, to use no stronger expression, that it is the peculiar province of the brain to secrete this fluid from the blood, and consequently that the blood originally contains the vital principle.

After it is allowed that the blood contains the vital principle, it becomes another question not very easily solved, Whence is this vital principle derived?—For this we can only discover two sources; namely, the chyle or aliment from which the blood is prepared, and respiration. The latter hath been commonly held as the principal source of the vital principle; and, for a long time, it was generally thought that there was a kind of vivifying spirit in the air, which being absorbed by the blood at each inspiration, communicated to that fluid the quality necessary for preserving animal life. As a

Blood.

* See Electricity.

22
Vivifying
spirit sup-
posed to be
derived
from the

proof

Blood.

proof of this it was urged, that life cannot be supported without respiration, and that air which hath been often breathed ceases to be capable of supporting life; because when once it has been totally deprived of its vivifying spirit, it can communicate none to the blood in any subsequent respirations.—This doctrine, however, hath been denied, and, as is generally thought, exploded by modern discoverers. Dr Hales brings several experiments against it; of which the following may serve for a specimen, and which we shall give in his own words.

“ I tied a middle-sized dog alive on a table, and, having laid bare his wind-pipe, I cut it asunder just below the larynx, and fixed fast to it the small end of a common foшет : the other end of the foшет had a large bladder tied to it, which contained 162 cubic inches; and to the other end of the bladder was tied the great end of another foшет whose orifice was covered with a valve which opened inwards, so as to admit any air that was blown into the bladder, but none could return that way; yet, for further security, that passage was also stopped by a pigot.

“ As soon as the first foшет was tied fast to the wind-pipe, the bladder was blown full of air through the other foшет : when the dog had breathed the air in the bladder to and fro for a minute or two, he then breathed very fast, and shewed great uneasiness, as being almost suffocated.

“ Then with my hand I pressed the bladder hard, so as to drive the air into his lungs with some force; and thereby make his abdomen rise by the pressure of the diaphragm, as in natural breathings; then taking alternately my hand off the bladder, the lungs with the abdomen subsided: I continued in this manner to make the dog breathe for an hour; during which time, I was obliged to blow fresh air into the bladder every five minutes, three parts in four of that air being either absorbed by the vapours of the lungs, or escaping through the ligatures upon my pressing hard on the bladder.

“ During this hour, the dog was frequently near expiring, whenever I pressed the air but weakly into his lungs; as I found by his pulse, which was very plain to be felt in the great crural artery near the groin, which place an assistant held his finger on most part of the time: but the languid pulse was accelerated so as to beat fast, soon after I dilated the lungs much by pressing hard upon the bladder; especially when the motion of the lungs was promoted by pressing alternately the abdomen and the bladder, whereby both the contraction and dilatation of the lungs was increased.

“ And I could by this means rouse the languid pulse whenever I pleased, not only at the end of every five minutes, when more air was blown into the bladder from a man's lungs, but also towards the end of the five minutes, when the air was fullest of fumes.

“ At the end of the hour, I intended to try whether I could have by the same means kept the dog alive some time longer, when the bladder was filled with the fumes of burning brimstone; but being obliged to cease for a little time from pressing the air into his lungs, while matters were preparing for this additional experiment, in the mean time the dog died, which might otherwise have lived longer if I had continued to force the air into the lungs.

“ Now, though this experiment was so frequently

disturbed, by being obliged to blow more air into the bladder 12 times during the hour; yet since he was almost suffocated in less than two minutes, by breathing of himself to and fro the first air in the bladder, he would have died in less than two minutes when one fourth of the old air remained in the bladder, immediately to taint the new air admitted from a man's lungs; so that his continuing to live through the whole hour, must be owing to the forcible dilatation of the lungs by compressing the bladder, and not to the vivifying spirit of the air.”

Dr Priestley, who hath carried his discoveries to a much greater length than any of his predecessors, concludes from his own observations, and no doubt very justly, that air which hath been often breathed becomes pernicious by its accumulated phlogiston, which stimulates the lungs, and makes the animal fall into convulsions. Respiration therefore, he thinks, indeed we may say he demonstrates, to be a phlogistic process, in which the blood parts with its superfluous phlogiston. He doth not say, that the blood receives nothing in exchange; he rather thinks that it may receive some nitrous principle, which gives it the red colour: but as to a vivifying spirit, he doth not appear to have the least idea of any such thing being received at that time. Nay, in his first volume, p. 277. he expressly adopts the other hypothesis, namely, that the vital principle is received from the chyle. “ My conjecture (says he) is, that animals have a power of converting phlogiston, from the state in which they receive it in their nutriment, into that state in which it is called the *electrical fluid*; that the brain, besides its other proper uses, is the great laboratory and repository for this purpose; that by means of the nerves this great principle, thus exalted, is directed into the muscles, and forces them to act in the same manner as they are forced into action when the electric fluid is thrown into them *ab extra*.”

With regard to the experiment made by Dr Hales, that the want of elasticity, or pressure, is the reason why phlogisticated air cannot support animal-life, we are of opinion that it is totally inconclusive, because it doth not at all appear that phlogisticated air wants elasticity; on the contrary, from Dr Priestley's experiments it appears to be more elastic than common air: besides, we know that the elasticity of every fluid must always be in proportion to the pressure upon it, as reaction is always equal to action. Supposing therefore the elasticity of any portion of air to be destroyed, the pressure of the superincumbent atmosphere will reduce it into a proportionally less bulk, and then it is equally elastic with the rest; for if it was not, it behaved still to yield under the pressure. Hence we may see, that as the bladder made use of in Dr Hales's experiment was by no means sufficient to keep off the pressure of the external atmosphere, the death of the dog could not be fairly ascribed to want of elasticity in the tainted air. When he applied more force than the natural elasticity of the air, he kept the dog *alive*, as he calls it, for an hour; but we can by no means allow a mechanical circulation of the blood to be life, any more than we can allow a dead body to be alive on account of the motion of its arm or any other member by mechanical means. The experiment, however, is valuable, because it shews that respiration is one of the immediate mechanical agents by which the circulation of the blood is carried

Blood.

25
Dr Priestley's opinion.

26
Dr Hales's experiment inconclusive

23
This doctrine now generally denied.

24
Dr Hales's experiment against a vivifying spirit.
Statistical Essays, Vol. I. p. 255.

Blood.

Blood.

carried on; but in order to prove that the dog was really kept alive by this means, he ought to have recovered from the effects of the experiment. Had Dr Hales tried a similar experiment on himself, by taking the fosslet in his mouth, closing his nostrils, and causing another person compress the bladder, we have not the least doubt, that he would then have felt such a method of breathing not to be a way of preserving life, but of destroying it.

As to any conclusions which may be derived from Dr Priestley's experiments, we are sorry to observe, that very many philosophers, sometimes indeed Dr Priestley himself, seem to attend but to one half of the consequences of their own experiments. In the present case this is exceedingly remarkable. Dr Priestley finds, that by admitting phlogiston to air, it is considerably diminished in quantity. But by what means is it so? Certainly the mere accession of any material substance can never diminish, but must increase, its bulk. The diminution therefore, on the accession of phlogiston, is an evident proof that some part of the air is actually taken away. That the phlogiston received is not incorporated with the air is likewise evident, as well as that it takes up space in the tainted air, because, by agitation in water, the phlogistic matter separates from the air, and enters into the water. The consequence of this is, that the air is still farther diminished in bulk; and what remains is pure air, fit for supporting animal-life, and of being farther diminished by phlogiston as before. It is also certain, that phlogiston is not endowed with any inherent power by which it can expand itself; otherwise it would fly off *in vacuo*, which it never is known to do. Another circumstance we must also attend to is, that the action of phlogiston seems to be entirely confined to a particular part of the atmosphere; namely, that which is now so well known by the name of *fixed air*. This it entirely deprives of its elastic principle, so that it is actually no longer air, but becomes a solid substance, making a part, and that no inconsiderable one, of innumerable terrestrial substances, as chalk, brimstone, &c.

That the justness of the conclusion which we are now about to draw from Dr Priestley's experiments may be more apparent, we shall briefly sum up the phenomena from whence it is drawn, in the two following propositions. 1. Phlogiston cannot act by itself without the assistance of air. 2. The emission of phlogiston is attended with the total destruction of the elasticity of a certain quantity of fixed air, which then ceases to be fluid. Hence we affirm, that it is not the phlogistic substance which acts upon the air, but the elastic principle in the fixed air contained in the common atmosphere that acts on the phlogistic substance. This elastic principle, entering the phlogistic body, displaces a quantity of phlogiston equivalent to its own quantity, and takes its place; and hence proceeds the first diminution of the air, not from an accession of phlogiston, but from an escape of the elastic principle belonging to fixed air. The phlogiston and fixed particles of the air now hang loose like smoke or vapour, and are ready to be attracted by any thing capable of imbibing them; and hence proceeds the second diminution by agitation in water.

Now, to apply this reasoning to the point in question. The blood is found to emit phlogiston from the lungs

at every expiration; therefore we affirm it hath received a proportional quantity of elastic vapour which it had not before. Again: The air expelled from the lungs is found to contain much of the fixable part floating loose, and capable of being attracted by lime-water, &c.; therefore we say, this elastic principle hath come from that part of the atmosphere. But, to put the matter beyond doubt, the very inspection of arterial and venous blood will shew, that the first hath a quantity of elastic matter in it which the last wants: and as the brain as well as all other parts of the body are supplied with arterial blood, we think it abundantly evident, that this elastic principle is absolutely and essentially necessary to life; that it is continually expended thereon; and that it may be said with the utmost propriety, that every time we draw the air into our lungs, we receive a portion of vivifying or vital spirit from it into our blood. Add to all this, that many substances which are commonly observed to phlogisticate air, appear to receive an elastic spirit by so doing. Putrefying bodies swell: they would not do so *in vacuo*; and therefore we must conclude, that they receive this elastic principle which swells them from the external air, and experience shews that it is communicated by this fixable part of the atmosphere.

The foregoing reasoning, which to us appears sufficiently conclusive, leads to a very important discovery in natural philosophy, viz. That it is to the atmosphere, and to that particular part of it which goes by the name of *fixed air*, that we are every moment indebted for that vital spirit which animates our bodies, and is the immediate bond of union betwixt our immaterial spirit and this visible world. It may be asked indeed, If fixed air is capable of supplying this spirit in such plenty, how comes it to be so instantaneously fatal when breathed? The reply to this, however, is obvious: it communicates too great a degree of elasticity to the blood; whence the circulation is stopped, and instant death ensues. That this is really the case, appears from the following account of the symptoms observed on the dissection of persons who have been suffocated by this kind of air.

1. The vessels of the brain are gorged with blood, and the ventricles of that viscus are filled sometimes with a frothy, sometimes with a bloody, serosity. 2. The trunk of the pulmonary artery is much distended, and the lungs appear nearly in a natural state. 3. The right ventricle and auricle of the heart, the venæ cavæ, and jugular veins, are full of frothy blood. 4. Bloody serosity is often found in the bronchizæ. 5. The trunk of the pulmonary veins, and the left auricle, are either empty, or almost empty, of blood. 6. The blood found in the places that have been mentioned, is generally fluid, and as it were in a dissolved state. It is easily extravasated into the cellular texture, of the head particularly, because it is in this part that it abounds most. 7. The epiglottis in suffocated persons is raised, and the glottis open and free. 8. The tongue is much swelled, and can hardly be contained within the mouth. 9. The eyes protrude, and preserve their lustre to the second or third day. They are often even brighter than natural. 10. The body preserves its heat for a long time. Nay the heat is sometimes greater than it is during life, or at least consistently with health. 11. The limbs are flexible for a long time after death. 12. The

30
Objection
answered.

Edinburgh
Medical
Comment.
Vol. III.
p. 256.

31
Appearances on the
dissection of
those suffocated
by fixed air.

face

27
Cause of the diminution of air by phlogiston, &c.

28
Why a phlogistic substance parts with its phlogiston.

29
Proof of a reception of a vivifying principle from the air.

³² Mood. face is more swelled, and often more red than usual. 13. The neck and upper extremities are sometimes so much swelled, that they appear to be inflamed. These swellings, however, do not, like oedematous ones, preserve the impression of the finger.

³³ Fixed air the cause of animal heat. This account is so much in favour of what we have already advanced concerning the action of fixed air, that we shall make no observation upon it farther than that this elastic principle would seem also to be the cause of animal-heat; for as the blood evidently received a vast quantity of elastic fluid, it also received a much greater proportion of heat than usual.

³³ Circulation of the blood how carried on. It now remains only to give some account of the means by which the circulation of the blood is carried on in the living body. From the time of Harvey till very lately, this was supposed to be chiefly the muscular power of the heart and arteries, which by some physiologists have been thought to be prodigiously great; and accordingly many calculations, requiring no small degree of mathematical knowledge to understand them, have been made of the forces requisite to perform this circulation. Other physiologists, however, have thought proper to take in several auxiliary helps, as the motion of the muscles, respiration, &c. and from Dr Hales's experiment abovementioned, it appears, that respiration hath a considerable influence in this matter. It cannot, however, be the sole cause, seeing the circulation is carried on in animals which do not respire.—In 1773, Dr Wilson, in the lecture already quoted, suggested a new principle of motion, which we believe was never used before to account for the circulation of animal fluids. It is shortly this. "As the fluids of the human body do all of them suffer a continual waste, and consequently require a constant supply in proportion, we must look upon their going out of the body to be the end of their motion, and on their entering into the body to be the beginning of it; and hence we are to look for the origin of all the motion of the fluids in that part of the system where the new supplies are taken in. This is the primæ viæ, where the lacteals absorb a fluid from the digested aliment, and convey it into the blood. The power by which this is accomplished, is necessarily independent of the heart, as having not the least connection with it. It has been said to be the same with that which causes fluids rise in capillary tubes; but though very probably the powers in both cases may be the same, there is this remarkable difference between them, that in the capillary tubes the fluids only rise to a certain height, and will not rise at all unless the tubes are empty. In the lacteals they rise in vessels already full, and continue to do so. Neither is the force, whereby this absorption is performed, to be accounted little; seeing the supply by the chyle must constantly be equal to the waste which is continually taking place in the fluids already contained in the vessels. We see also, with what force an absorption of this kind sometimes takes place in other cases; thus, ropes will absorb water with such strength as to raise immense weights fastened to them, and which no mechanical injection of water into small tubes could possibly accomplish. What is already said of the lacteals applies also to the lymphatics; and from thence we are almost tempted to conclude, that the case is the same with the sanguiferous veins also; that though there may be a continuation of some arteries into the veins correspond-

Blood. ing with them, yet that for the most part these vessels extravasate the blood into small cavities, which is then taken up by the absorbent power of the veins, and returned to the heart.

"If, however, the vessels continued absolutely full, it would be impossible that any motion could be carried on in them; and to continue and regulate the circulation, the heart with its cavities is provided. Let us suppose, that by the abovementioned power the veins are all full, and the auricles or chambers into which the veins empty themselves are full also: where is the collected stream in the veins to go next? There is no room for more in the auricle. What must be done? The auricle contracts and empties itself. The consequence is a sudden vacuum, equal to what the auricle could contain; the turgid veins, urged by the absorbing power above-mentioned, rush their contents into the auricle to fill up the vacuum again, and all behind moving in the venous direction advances forward with so much force, that the veins near the heart sustain a pulsation from the regurgitation of this impetuous stream, when the auricle shuts upon it to empty itself. In short, the full auricle occupies a determinate quantity of space in the breast: when it is emptied, there is a nonresisting vacuum of so much space as was full before, and thither there is a mechanical nifus from the remotest filament of a vein over the whole body, which becomes conspicuous in the torrent that rushes every other moment from the mouth of the vena cava into this vacuum."

This is a short abstract of Dr Wilson's new theory of the circulation. According to him, this absorbing power of the veins is the principal agent, while the heart and arteries do no more than empty themselves of the blood with which they are filled by the veins. Even this cause, however, he says would not be sufficient to carry on the circulation for a single moment, without the presence of another which he calls *life*, and does not consider as absolutely unmechanical, tho' we cannot reduce it either to mechanical rules or ideas. But, as we apprehend all speculations concerning such causes must be arbitrary and without foundation, we forbear to give any account of the Doctor's opinions on this subject.

³⁵ It hath been a general opinion, that blood, as it exists in the bodies of animals, contains a considerable quantity of common air; and indeed it is certain, that blood, after it has been drawn from the veins of any animal, and afterwards placed under the receiver of an air-pump, yields a very considerable quantity of air upon exhausting the receiver: but if a portion of any blood-vessel is tied up so as to prevent the escape of its contents, and then cut out of the body and placed under a receiver, it will not swell, or shew the least sign of its containing any quantity of air whatever.

³⁶ Blood was formerly held in great esteem as a medicinal and other uses of blood. Blood has been recommended as an infallible remedy for the elephantiasis, &c.; and the blood of goats and some other animals was used by the Galenists, and is recommended even by Dr Mead in pleuritis: but the first abominable medicine, as well as the other, is now deservedly exploded. The principal use of blood in the arts is for making Prussian blue, or sometimes for clarifying certain liquors; it is also recommended in

Blood.

Blood.

agriculture as an excellent manure for fruit-trees. A mixture of blood with lime makes an exceedingly strong cement; and hence it is of use in the preparation of some chemical lutes, the making floors †, &c.—As a food, it hath been disputed whether blood really affords any nourishment or not. The best judges now, however, are generally agreed that it is very nutritious; and 't' out of the body, like the white of an egg, it is very insoluble, yet, like that too, *in* the body it is commonly of easy digestion: It is, however, highly alescetic in hot climates; on which account the prohibition of it to the Israelites was very proper. Even in this country, when blood was used as food in great quantity, the scurvy was more frequent than at other times; but to a moderate use of it here no such objection takes place.

Religious uses of Blood. Among the ancients blood was used for the sealing and ratifying covenants and alliances, which was done by the contracting parties drinking a little of each others blood; and for appeasing the manes of the dead, in order to which blood was offered on their tombs, as part of the funeral ceremony.

The blood of victims was anciently the portion of the Gods; and accordingly was poured or sprinkled on the altars in oblation to them.

The priests made another use of blood, *viz.* for divination: the streaming of blood from the earth, fire, and the like, was held a prodigy, or omen of evil.

The Roman priests were not unacquainted with the use of blood in miracles: they had their fluxes of blood from images, ready to serve a turn; witness that said to have streamed from the statue of Minerva at Modena, before the battle at that place. But we know not whether in this their successors have not gone beyond them. How many relations in ecclesiastical writers of Madonas, crucifixes, and wafers, bleeding? At least the liquefaction of the blood of St Januarius at Naples, repeated annually for so many ages, seems to transcend by far all the frauds of the Grecian or Roman priesthood. But the chemists at last got into the secret; and we find M. Neumann at Berlin to have performed the miracle of the liquefaction of dried blood, with all the circumstances of the Neapolitan experiment.

Among the schoolmen we find a famous dispute, under Pope Pius II. whether the blood of Christ, which fell from him in the three days passion, retained or lost the hypostatic union; and consequently whether it was the proper object of adoration. The Dominicans maintained the former, the Franciscans the latter. It seems the dominican doctrine gained the ascendant, as being fitter to favour the profits of the monks; who becoming possessed some way or other of a few drops of this precious liquor, were secured of ample offerings from the deluded laity, who flocked to pay their homage to the sacred relic. Joseph of Arimathea is said to have first brought into Britain two silver vessels filled with the blood of Christ, which by his order was buried in his tomb. King Henry III. had a crystal, containing a portion of the same blood, sent him by the master of the temple at Jerusalem, attested with the seals of the patriarch; who treasure the king committed to the church of St Peter's, Westminster, and obtained from the bishops an indulgence of six years and 116 days to all that should visit it. Mat. Paris even assures us, that

the king summoning his nobles and prelates to celebrate the feast of St Edward in St Peter's church, was chiefly *pro veneratione sancti sanguinis Christi nuper adepti*, "in veneration of the holy blood of Christ lately acquired." Divers others of our monasteries were possessed of this profitable relic; as the college of Bon Hommes at Ashridge, and the abbey of Hales, to whom it was given by Henry, son of Richard duke of Cornwall, and king of the Romans. To it resorted a great concourse of people for devotion and adoration; till in 1538, as the reformation took place, it was perceived to be only honey clarified, and coloured with saffron, as was shewn at Paul's cross by the bishop of Rochester. The like discovery was made of the blood of Christ, found among the reliques in the abbey of Fescamp in Normandy, pretended to have been preserved by Nicodemus, when he took the body from the cross, and given to that abbey by William duke of Normandy: it was buried by his son Richard, and again discovered in 1171, and attended with different miracles; but the cheat, which had been long winked at, was at length exposed, the relation of which is given by Speed.

Avenger of Blood, among the Jews, was the next of kin to the person murdered, who was to pursue the murderer.

Ecclesiastical judges retire, when judgment is to be given in *cases of blood*, by reason the church is supposed to abhor blood: it condemns no person to death; and its members become irregular, or disabled from their functions, by the effusion of blood.

Field of Blood, *ayel el amsar*, in Syriac *aceldama*, was a field purchased by the Jews, with the thirty pieces of silver which had been given to Judas for betraying his Master, and which he had restored. It still serves for a burial-ground, in which all pilgrims who die in their pilgrimage at Jerusalem are interred.

Blood-Hound, in zoology, the *canis sagax* of Linnaeus *, *le chien courant* of Buffon, the *sleuthounds* of the Scots: The hound, or dog, with long, smooth, and pendulous ears.—It was a dog of great use, and in high esteem with our ancestors: its employ was to recover any game that had escaped wounded from the hunter, or been killed and stole out of the forest. It was remarkable for the acuteness of its smell, tracing the lost beast by the blood it had spilt; from whence the name is derived. This species could, with the utmost certainty, discover the thief by following his footsteps, let the distance of his flight be ever so great, and through the most secret and thickest coverts: nor would it cease its pursuit, till it had taken the felon. They were likewise used by Wallace and Bruce during the civil wars. The poetical historians of the two heroes, frequently relate very curious passages on this subject; of the service these dogs were of to their masters, and the escapes they had from those of the enemy. The blood-hound was in great request on the confines of England and Scotland; where the borderers were continually preying on the herds and flocks of their neighbours. The true blood-hound was large, strong, muscular, broad breasted, of a stern countenance, of a deep tan-colour, and generally marked with a black spot above each eye.

Blood-Shotten. See OPHTHALMIA.

Blood Spavin. See FARRIERY, § xxxii. 2.

Spitting

† See Architecture, n^o 116.

* See Canis.

Blood.

Spitting of BLOOD, or Hæmoptie. See *Index* subjoined to *MEDICINE*.

BLOOD of Christ, the name of a military order instituted at Mantua in 1608. The number of knights was restricted to 20, besides the grand master. Their device was, *Domine, probasti me*; or *Nihil hoc, triste, recepto*: "Lord, thou hast proved me;" or, "Fortified by this, no evil can prevail."

Precious BLOOD, a denomination given to a reformed congregation of Bernardine nuns at Paris, first established under that name in 1661.

Dragon's BLOOD. See *DRAGON*.

BLOOD-Stone. See *HÆMATITES*.

BLOOD-Vessels. See *ANATOMY*, n° 387, &c. and *Plate XVII*.

BLOOD-Write, in ancient law-writers, a mulct or fine for shedding of blood.

BLOOD-Work, in botany. See *RUMEX*.

BLOOD (Thomas), generally known by the appellation of *Col. Blood*, was a disbanded officer of Oliver Cromwell's, famous for his daring crimes and his good fortune. He was first distinguished by engaging in a conspiracy to surprise the castle of Dublin; which was defeated by the vigilance of the duke of Ormond, and some of his accomplices were executed. Escaping to England, he meditated revenge against Ormond; and actually seized him one night in his coach in St James's-street, where he might have finished his purpose if he had not studied refinements in his vengeance. He bound him on horseback behind one of his associates, resolving to hang him at Tyburn, with a paper pinned to his breast: but when they got into the fields, the duke, in his efforts for liberty, threw himself and the assassin, to whom he was fastened, to the ground; and while they were struggling in the mire, he was rescued by his servants, but the authors of this attempt were not then discovered. A little after, in 1671, Blood formed a design of carrying off the crown and regalia from the tower; a design, to which he was prompted, as well by the surprising boldness of the enterprize, as by the views of profit. He was very near succeeding. He had bound and wounded Edwards the keeper of the jewel-office, and had got out of the tower with his prey; but was overtaken and seized, with some of his associates. One of them was known to have been concerned in the attempt upon Ormond; and Blood was immediately concluded to be the ringleader. When questioned, he frankly avowed the enterprize; but refused to discover his accomplices. "The fear of death (he said) should never engage him either to deny a guilt or betray a friend." All these extraordinary circumstances made him the general subject of conversation; and the king was moved with an idle curiosity to see and speak with a person so noted for his courage and his crimes. Blood might now esteem himself secure of pardon; and he wanted not address to improve the opportunity. He told Charles, that he had been engaged, with others, in a design to kill him with a carabine above Battersea, where his majesty often went to bathe: that the cause of this resolution was the severity exercised over the consciences of the godly, in restraining the liberty of their religious assemblies: that when he had taken his stand among the reeds, full of these bloody resolutions, he found his heart checked with an awe of majesty; and he not only relented him-

self, but diverted his associates from their purpose: that he had long ago brought himself to an entire indifference about life, which he now gave for lost; yet could he not forbear warning the king of the danger which might attend his execution: that his associates had bound themselves by the strictest oaths to revenge the death of any of their confederacy; and that no precaution nor power could secure any one from the effects of their desperate resolutions. Whether these considerations excited fear or admiration in the king, they confirmed his resolution of granting a pardon to Blood; but he thought it a requisite point of decency first to obtain the duke of Ormond's consent. Arlington came to Ormond in the king's name, and desired that he would not prosecute Blood, for reasons which he was commanded to give him. The duke replied, that his majesty's commands were the only reason that could be given; and being sufficient, he might therefore spare the rest. Charles carried his kindness to Blood still farther: he granted him an estate of 500*l.* a-year in Ireland; he encouraged his attendance about his person; he shewed him great countenance; and many applied to him for promoting their pretensions at court. And while old Edwards, who had bravely ventured his life, and had been wounded, in defending the crown and regalia, was forgotten and neglected, this man, who deserved only to be stared at, and detested as a monster, became a kind of favourite.—Blood enjoyed his pension about 10 years, till being charged with fixing an imputation of a scandalous nature on the duke of Buckingham, he was thrown into prison, where he died, August 24th, 1680.

BLOODY, something belonging to, or abounding with, blood.

BLOODY-Flux. See the *Index* subjoined to *MEDICINE*.

BLOODY-Hand, is when a trespasser is apprehended in a forest with his hands or other parts bloody; which is a circumstance of his having killed the deer, though he be not found chasing or hunting them.

BLOODY-Rain. See *RAIN*.

BLOODY-Urine. See *URINE*.

BLOOM, a mass of iron after having undergone the first hammering called *blomary* †.—It has yet to undergo many hammerings before it become iron fit for the smith's use, and be first made what they call the *anconny*. See *ANCONY*.

BLOSSOM, in a general sense, denotes the flower of any plant. See the article *FLOWER*.

Blossom, in a more proper sense, is restrained to the flowers of trees, which they put forth in the spring as the fore-runners of their fruit, otherwise called their *blom*. The office of the blossom is partly to protect, and partly to draw nourishment to, the embryo, fruit, or seed.

Blossom, or *Peach-coloured*, in the menage, a term applied to a horse that has his hair white, but intermixed all over with sorrel and bay hairs. Such horses are so insensible and hard both in the mouth and the flanks, that they are scarce valued; besides they are apt to turn blind.

BLOSSOMING OF PLANTS, the act of blowing, or putting forth flowers or blossoms, called also *flowering* *. The blossoming of the spina acuta, or Glasterbury thorn, piously on Christmas-day-morning, is a vulgar

Blood
|
Blossoming.

* See *Blow*.
135.

Blount.

error; owing to this, that the plant, besides its usual blossoming in the spring, sometimes puts forth a few white transient blossoms in the middle of winter. For the blossoming of the rose of Jericho on the same day, as it is commonly held in England, or in the time of midnight mals, as it is held in France, is somewhat more than an error, being really a fraud on one side, and a superfluous on the other. This rose, whose leaves are only closed and shrivelled up in winter, will, at any time, upon setting its pedicle in water, expand and blossom a-new; because the pedicle being spongy imbibes the fluid apace, and thus fills and swells out the shrivelled leaves: which property some monks have turned to good account.

BLOUNT (Thomas), a learned English writer of the 17th century, born at Bordesley in Worcestershire. He had not the advantage of an university education; but, by strength of genius and great application, made a considerable progress in literature. Upon the breaking out of the popish plot in the reign of king Charles II. being much alarmed on account of his being a zealous Roman-catholic, he contracted a palsy; and died in December 1679, aged 61. He wrote, 1. The academy of eloquence, containing a complete English rhetoric. 2. Glossographica, or a dictionary interpreting such hard words, whether Hebrew, Greek, Latin, Italian, &c. that are now used in our refined English tongue, &c. 3. Boscobel; or the history of his majesty's escape after the battle of Worcester. 4. A law dictionary. 5. Animadversions upon Sir Richard Baker's chronicle. 6. *Fragmenta Antiquitatis*; and other works.

BLOUNT (Sir Henry), an English writer, born at his father's seat in Hertfordshire in 1602. After a regular education, he set out on his travels in 1634; and getting acquainted with a janizary at Venice, he accompanied him into the Turkish dominions: having been abroad two years, he returned and published a relation of his travels in the Levant, which went thro' several editions. He was knighted by Charles I. and was at the battle of Edge-hill, at which time he is supposed to have had the care of the young princes; but, after the king's death, was employed by the parliament, and by Cromwell. Yet after the restoration of the royal family, he was appointed high sheriff of the county of Hertford, and from that time lived as a private gentleman above 20 years. He published, 1. An account of his travels. 2. Six comedies, written by John Lilly, under the title of *Court Comedies*. 3. The exchange walk, a satire; and 4. An epistle in praise of tobacco. He died October 9th, 1682.

BLOUNT (Sir Thomas Pope), baronet, an eminent writer, and the eldest son of the former, was born at Upper Holloway, in the county of Middlesex, September 12th, 1649. He was educated under the eye of his father; and always distinguished himself as a lover of liberty, a sincere friend to his country, and a true patron of learning. He was advanced to the degree of baronet by king Charles II. in whose reign he was elected burgess for St Alban's in two parliaments, and was knight of the shire in three parliaments after the Revolution. He wrote in Latin, 1. A critique on the most celebrated writers. 2. Essays on several subjects. 3. A natural history, extracted out of the best modern writers; and, 4. Remarks upon poetry, with characters and censures of

the most considerable poets, whether ancient or modern. He died June 30th, 1697.

BLOUNT (Charles), younger brother of Sir Thomas Pope Blount, had also an excellent capacity, and was an eminent writer. His *Anima Mundi*, or *An historical narration of the opinions of the ancients, concerning man's soul after this life, according to unenlightened nature*, gave great offence, and was complained of to the bishop of London. But the work which rendered him most known, was his translation of Philostratus's *Life of Apollonius Tyaneus*, published in 1680; which was soon suppressed, as an attack on revealed religion. Another work of the same complexion he published the same year, called *Great is Diana of the Ephesians*, &c. in which, under colour of exposing superstition, he struck at revelation: In 1684, he printed a kind of *Introduction to Polite Literature*. In the warmth of his zeal for the Revolution, he wrote a pamphlet to prove king William and queen Mary conquerors; which was condemned to be burnt by both houses of parliament. The close of his life was very unhappy. For, after the death of his wife, he became enamoured of her sister, who was only scrupulous against their union on account of their prior connection by the marriage; on which he wrote a letter on the subject, as the case of a third person, with great learning and address. But the archbishop of Canterbury and other divines deciding against him, and the lady on this growing inflexible, it threw him into a frenzy in which he shot himself, in 1693. After his death, his miscellaneous pieces were collected and published.

BLOW (Dr John), a famous musician and composer, was a native of North Collingham in the county of Nottingham; and was one of the first set of children after the restoration, being bred up under Captain Henry Cook. He was also a pupil of Hingelton, and after that of Dr Christopher Gibbons. On the 16th day of March, 1673, he was sworn one of the gentlemen of the chapel in the room of Roger Hill; and in July, 1674, upon the decease of Mr Pelham Humphrey, was appointed master of the children of the chapel.

In 1685, he was made one of his majesty's private music; and in 1687, was appointed almoner and master of the choristers of the cathedral church of St Paul. Blow was not a graduate of either university; but archbishop Sancroft, in virtue of his own authority in that respect, conferred on him the degree of doctor in music. Upon the decease of Purcell in 1695, he became organist of Westminster-abbey. In the year 1699, he was appointed composer to his majesty, with a salary.

Blow was a composer of anthems while a chapel-boy, and on the score of his merit was distinguished by Charles II. The king admired very much a little duet of Carissimi to the words 'Dite o Ciel!', and asked of Blow if he could imitate it. Blow modestly answered he would try; and composed in the same measure, and the same key of D with a minor third, that fine song, 'Go perjured man.'

The *Orpheus Britannicus* of Purcell had been published by his widow soon after his decease; and contained in it some of that author's finest songs: the favourable reception it met with was a motive with Blow to the publication, in the year 1700, of a work of the same kind, entitled *Amphion Anglicus*, containing compositions for one, two, three, and four voices, with

Blount.
Blow.

Blow.—accompaniments of instrumental music, and a thorough-bass figured for the organ, harpsichord, or theorbo-lute. To this book are prefixed commendatory verses by sundry persons; and among them an ode, in the second stanza of which are the following lines:

- ‘ His *Gloria Patri* long ago reach’d Rome,
- ‘ Sung and rever’d too in St Peter’s dome;
- ‘ A canon will outlive her jubbiles to come.’

The canon here meant is that fine one to which the *Gloria Patri* in Dr Blow’s gamut service is set. Dr Blow set to music an ode for St Cecilia’s day, in 1684, the words by Mr Oldham, published together with one of Purcell on the same occasion performed the preceding year. He also composed and published a collection of lessons for the harpsichord or spinnet, and an ode on the death of Purcell, written by Mr Dryden. There are also extant of his composition sundry hymns printed in the *Harmonia Sacra*, and a great number of catches in the latter editions of the musical companion.

This great musician died in the year 1708, and lies buried in the north aisle of Westminster-abbey. On his monument is the canon above mentioned, engraven on a book with an inscription above it.

BLOW, in a general sense, denotes a stroke given either with the hand, a weapon, or instrument. In fencing, blows differ from thrusts, as the former are given by striking, the latter by pushing.

Military Blow, *alapa militaris*, that given with a sword on the neck or shoulder of a candidate for knighthood, in the ceremony of dubbing him. The custom seems to have taken its rise from the ancient ceremony of manumission. In giving the blow, the prince used the formula *Ego bonus miles*, “Be a valiant soldier;” upon which the party rose a complete knight, and qualified to bear arms in his own right.

BLOW, in law. See BATTERY.

Fly-Blows, the ova of flies deposited on flesh, or other substances proper for hatching them.

Blow-Pipe, among jewellers and other artificers, is a glass tube, of a length and thickness at discretion, wherewith they quicken the flame of their lamp, by blowing through it with their mouth. It is used in works of quicker dispatch, which do not need the bellows. Though the wind blown out at a small bent tube of glass, called a *blow-pipe*, seems not to have any great celerity, in comparison of the parts of flame, and is itself of little force; yet, when the flame of a lamp or candle is directed by it, so as to beat upon a body at a convenient distance, it may be made to melt silver, or even copper itself, which yet may be kept, for many hours, unmelted in a red-hot crucible, or the flame of the lamp or candle unaffected by the blast. The enamellers have also tubes of divers sizes, wherewith to blow their enamel, answering to the same purpose as the *portillo*, or *blow-pipe*, of glassmen.

The blow-pipe has also been a little used by chemists and mineralists. But Mr Cronsted has lately extended its use to the examination of all mineral bodies; which by means thereof, with a candle and piece of charcoal, may, in portions sufficient for mineralogical experiments, be burnt, calcined, melted, or scorified, &c. as well as in any great works.—This instrument is composed of two parts; and this for the facility both of making, carrying it along, and cleaning it in the

inside when necessary. The two parts are represented separate †, and of the true size; the figure of the instrument, when these are put together, may be easily conceived. The globe *a* (n° 2.) is hollow; and made on purpose to condense the vapours, which always happen to be in the blow-pipe when it has been used some time: if this globe was not there, the vapours would go directly with the wind out into the flame, and thereby cool the assay. The hole in the small end *b*, thro’ which the wind comes out, ought not to be larger than the size of the finest wire. This hole may now and then happen to be stopped up by something coming into it, so as to hinder the force of the wind: one ought therefore to have a piece of the finest wire, to clear it with when required; and, in order to have this wire the better at hand, it may be fastened round the blow-pipe, in such a manner as is represented in n° 1: *c* is the wire fastened round the blow-pipe, and afterwards drawn through a small hole at *e*, made in the ring *f*, to keep it more steady. In order to determine the most convenient proportions of this instrument, several blow-pipes of different sizes, both bigger and smaller, have been tried: the former have required too much wind; and the latter, being too soon filled with the wind, have returned it back again upon the lungs: both these circumstances hindered greatly the experiments, and are perhaps even prejudicial to the health. The size here given is found to answer best; and though the hole must be as small as abovementioned, yet the sides of the pipe at the point must not be thinner, nor the point narrower, than here represented, else it will be too weak, and not give so good a flame. It is also to be observed, that the canal throughout the pipe, but particularly the hole at the small end, must be made very smooth, so that there be no inequalities in it; the wind would else be divided, and consequently the flame made double. That blow-pipe is to be reckoned the best, through which can be formed the longest and most pointed flame from off a common-sized candle. These blow-pipes are commonly made of brass or silver. The manner of using them in mineralogical experiments are explained under the article MINERALOGY.

BLOWING, in a general sense, denotes an agitation of the air, whether performed with a pair of bellows, the mouth, a tube, or the like. Butchers have a practice of blowing up veal, especially loins, as soon as killed, with a pipe made of a sheep’s flank, to make it look larger and fairer.

BLOWING of Glass, one of the methods of forming the various kinds of works in the glass manufacture. It is performed by dipping the point of an iron blowing-pipe in the melted glass, and blowing through it with the mouth, according to the circumstances of the glass to be blown. See GLASS.

BLOWING of Tin denotes the melting its ore, after being first burnt to destroy the muddle.

Machines for BLOWING the Air into Furnaces. See the article FURNACE.

BLOWING, among gardeners, denotes the action of flowers, whereby they open and display their leaves. In which sense, blowing amounts to much the same with flowering or blossoming.*

The regular blowing season is in the spring; though some plants have other extraordinary times and manners of blowing, as the Glastebury thorn. Divers flowers

Blow,
Blowing
† Plate I.
fig. 2.
n° 1.

* See Flow-
ing and
Blossoming.

Blubber
Bluing.

flowers also, as the tulip, close every evening, and blow again in the morning. Annual plants blow sooner or later, as their seeds are put in the ground; whence the curious in gardening sow some every month in summer, to have a constant succession of flowers. The blowing of roses may be retarded by shearing off the buds as they put forth.

BLUBBER, denotes the fat of whales and other large sea-animals, whereof is made train-oil. It is properly the *adeps* of the animal: it lies immediately under the skin, and over the muscular flesh. In the porpoise, it is firm and full of fibres, and invests the body about an inch thick. In the whale, its thickness is ordinarily six inches; but, about the under lip, it is found two or three feet thick. The whole quantity yielded by one of these animals ordinarily amounts to 40 or 50, sometimes to 80 or more, hundred weight. The use of blubber to the animal seems to be partly to poise the body, and render it equiponderant to the water; partly to keep off the water at some distance from the blood, the immediate contact whereof would be apt to chill it; and partly also for the same use that clothes serve us, to keep the fish warm, by reflecting or reverberating the hot steams of the body, and so redoubling the heat; since all fat bodies are, by experience, found less sensible of the impressions of cold than lean ones. Its use in trade and manufactures is to furnish train-oil, which it does by boiling down. Formerly this was performed ashore, in the country where the whales were caught: but of late the fishers do not go ashore; they bring the blubber home stowed in casks, and boil it down here.

Sea-Blubber. See *MEDUSA*.

BLUE, one of the seven colours into which the rays of light divide themselves when refracted through a glass prism.—For an account of the particular structure of bodies by which they appear of a blue colour, see the article *CHROMATICS*.—The principal blues used in painting are Prussian blue, bice, Saunders blue, azure, or smalt, verditer, &c.; for the preparation of which, see *COLOUR-MAKING*.—In dyeing, the principal ingredients for giving a blue colour are indigo and woad. See *DYEING*.

Blue Colour of the Sky. See *SKY*.

Blue Bird. See *MOTACILLA*.

Blue Fish. See *CORYPHENA*.

Blue Japan. Take gum-water, what quantity you please, and white lead a sufficient quantity; grind them well upon a porphyry: then take isinglass size what quantity you please, of the finest and best smalt a sufficient quantity; mix them well: to which add, of your white lead, before ground, so much as may give it a sufficient body. Mix all these together to the consistence of a paint.

BLUING, the act or art of communicating a blue colour to bodies otherwise destitute thereof. Landresses blue their linen with smalt; dyers their stuffs and wools with woad or indigo.

BLUING of Metals is performed by heating them in the fire, till they assume a blue colour; particularly practised by gilders, who blue their metals before they apply the gold and silver leaf.

BLUING of Iron, a method of beautifying that metal sometimes practised; as for mourning buckles, swords, and the like. The manner is thus: Take a piece of

grind-stone or whet-stone, and rub hard on the work, to take off the black scurf from it: then heat it in the fire; and as it grows hot, the colour changes by degrees, coming first to light, then to a darker gold colour, and lastly to a blue. Sometimes also they grind indigo and fallad-oil together; and rub the mixture on the work with a woollen rag, while it is heating, leaving it to cool of itself. Among sculptors we also find mention of bluing a figure of bronze, by which is meant the heating of it, to prepare it for the application of gold-leaf, because of the bluish cast it acquires in the operation.

BLUFF-HEAD, among sailors. A ship is said to be bluff-headed, that has an upright stern.

BLUNDERBUSS, a short fire-arm with a wide bore, capable of holding a number of bullets at once.

BOA, in zoology, a genus of serpents, belonging to the order of amphibia. The characters of this genus are, that the belly and tail are both furnished with scuta. The species are ten, viz. 1. The contortrix, has 150 scuta on the belly, and 40 on the tail: the head is broad, very convex, and has poison-bags in the mouth, but no fang, for which reason its bite is not reckoned poisonous: the body is ash-coloured, interperfed with large dusky spots; and the tail is about a third of the length of the body. This serpent is found in Carolina. 2. The canina, has 203 scuta on the belly, and 77 on the tail; it is greenish, and variegated with white belts. It is a native of America, and lodges in the hollow trunks of trees, and is about two feet long. The bite of the canina is not poisonous. 3. The hipnale, is of a dull yellow colour, and is found in Asia. It has 179 scuta on the belly, and 120 on the tail.

4. The constrictor, has 240 scuta on the belly, and 60 on the tail. This is an immense animal: it often exceeds 36 feet in length; the body is very thick, of a dusky white colour, and its back is interperfed with 24 large pale irregular spots; the tail is of a darker colour; and the sides are beautifully variegated with pale spots. Besides, the whole body is interperfed with small brown spots. The head is covered with small scales, and has no broad lamine betwixt the eyes, but has a black belt behind the eyes. It wants the large dog-fangs, and of course its bite is not poisonous. The tongue is fleshy, and very little forked. Above the eyes, on each side, the head rises high. The scales of this serpent are all very small, roundish, and smooth. The tail does not exceed one eighth of the whole length of the animal. The Indians, who adore this monstrous animal, use the skin for cloaths, on account of its smoothness and beauty. There are several of these skins of the above dimensions preserved, and to be seen in the different museums of Europe, particularly in the library and botanic garden of Upsal in Sweden, which has of late been greatly enriched by count Grillinborg. The flesh of this serpent is eat by the Indians, and the negroes of Africa. Piso, Margraave, and Kempfer, give the following account of its method of living and catching its prey. It frequents caves and thick forests, where it conceals itself, and suddenly darts out upon strangers, wild beasts, &c. When it clifts a tree for its watching-place, it supports itself by twisting its tail round the trunk or a branch, and darts down upon sheep, goats, tigers, or any animal that comes with-
in

Bluff-head
Boa.

Fig. 1.
Battering Ram

Fig. 2.
Bern
Machine.
N^o 1.



Fig. 3.
BIGNONIA RADICANS
Trumpet flowers

Fig. 5. Blocks



N^o 2.

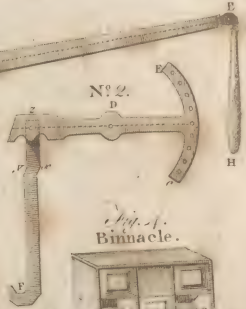


Fig. 4.
Binnacle.





in its reach. When it lays hold of animals, especially any of the larger kinds, it twists itself several times round their body, and by the vast force of its circular muscles bruises and breaks all their bones. After the bones are broke, it licks the skin of the animal all over, befouling it with a glutinous kind of saliva. This operation is intended to facilitate deglutition, and is a preparation for swallowing the whole animal. If it be a stag, or any horned animal, it begins to swallow the feet first, and gradually sucks in the body, and last of all the head. When the horns happen to be large, this serpent has been observed to go about for a long time with the horns of a stag sticking out from its mouth. As the animal digests, the horns putrify and fall off. After this serpent has swallowed a stag or a tiger, it is unable for some days to move; the hunters, who are well acquainted with this circumstance, always take this opportunity of destroying it. When irritated, it makes a loud hissing noise. This serpent is said to cover itself over with leaves in such places as stags or other animals frequent, in order to conceal itself from their sight, and that it may the more easily lay hold of them. See Plate LVIII.

5. The murina, has 254 scuta on the belly, and 65 on the tail. The colour of it is a light blue, with round spots on the back. It is a native of America, and its bite is not poisonous. 6. The scytale, has 250 scuta on the belly, and 70 on the tail. The body is ash-coloured and bluish, with round black spots on the back, and black lateral rings edged with white. This serpent is a native of America; and, like the constrictor, tho' not so long, twists itself about sheep, goats, &c. and swallows them whole. 7. The cenchria, has 265 scuta on the belly, and 57 on the tail. It is of a yellow colour, with white eye-like spots. It is a native of Surinam, and its bite is not poisonous. 8. The ophiias, has 281 scuta on the belly, and 64 on the tail; the colour is nearly the same with that of the constrictor, but browner. The place where this serpent is to be found is not known; but its bite is not venomous. 9. The enydris, has 270 scuta on the belly, and 105 on the tail. The colour is a dusky white, and the teeth of the lower jaw are very long; but its bite is not poisonous. It is a native of America. 10. The hortulana, has 290 scuta on the belly, and 128 on the tail. It is of a pale colour, interspersed with livid wedge-like spots. It is a native of America, and its bite is not poisonous.

BOADADA BASHEE, in the Turkish military orders, an officer of the janizaries, whose business it is to walk every day about the principal parts of the city, with a number of janizaries to attend him, to keep order, and see that all things are regular, even to the dress. This office is for three months, and from this the person is usually advanced to be a serach.

BOADICEA, a valiant British queen in the time of Nero the emperor, wife to Prasutagus king of the Iceni in Britain, who by his will left the emperor and his own daughters co-heirs to his great treasures, in expectation of procuring by that means Nero's protection for his family and people: but he was no sooner dead, than the emperor's officers seized all. Boadicea opposed these unjust proceedings; which was resented to such a pitch of brutality, that they ordered the lady to be publicly whipped, and her daughters to be ra-

vished by the soldiery. The Britons took arms, with Boadicea at their head, to shake off the Roman yoke; and made a general and bloody massacre of the Romans in all parts. The whole province of Britain would have been lost, if Suetonius Paulinus had not hastened from the isle of Mona to London; and with 10,000 men engaged the Britons, who had an army of 200,000. The battle was fought for a long time with great vigour and doubtful success, till at last victory inclined to the Romans. Boadicea, who had behaved with all bravery imaginable, dispatched herself by poison.

BOAR, in the menage. A horse is said to boar, when he shoots out his nose as high as his ears, and tosses his nose in the wind.

BOAR, a male swine. See SUS.

The wild boar, among huntsmen, has several names, according to its different ages: the first year, it is called a *pig of the faunder*; the second it is called a *hog*; the third, a *hog-steer*; and the fourth, a *boar*; when leaving the faunder, he is called a *singler* or *sangler*. The boar generally lives to 25 or 30 years, if he escapes accidents. The time of going to rut is in December, and lasts about three weeks. They feed on all sorts of fruits, and on the roots of many plants; the root of fern in particular seems a great favourite with them: and when they frequent places near the sea-coasts, they will descend to the shores and demolish the tenderer shell-fish in very great numbers. Their general places of rest are among the thickest bushes that can be found; and they are not easily put up out of them, but will stand the bay a long time. In April and May they sleep more sound than at any other time of the year, and this is therefore the successful time for the taking them in the toils. When a boar is roused out of the thicket, he always goes from it, if possible, the same way by which he came to it; and when he is once up, he will never stop till he comes to some place of more security. If it happens that a faunder of them are found together, when any one breaks away, the rest all follow the same way. When the boar is hunted in the wood where he was bred, he will scarce ever be brought to quit it; he will sometimes make towards the sides to listen to the noise of the dogs, but retires into the middle again, and usually dies or escapes there. When it happens that a boar runs a-head, he will not be stopt, or put out of his way, by man or beast, so long as he has any strength left. He makes no doubles nor crossings when chased; and when killed makes no noise, if an old boar; the fows and pigs will squeak when wounded.

The season for hunting the wild boar begins in September, and ends in December, when they go to rut. If it be a large boar, and one that has lain long at rest, he must be hunted with a great number of dogs, and those such as will keep close to him; and the huntsman, with his spear, should always be riding in among them, and charging the boar as often as he can, to discourage him: such a boar as this, with five or six couple of dogs, will run to the first convenient place of shelter; and there stand at bay, and make at them as they attempt to come up with him. There ought always to be relays also set of the best and staunchest hounds in the kennel; for if they are of young eager dogs, they will be apt to seize him, and be killed or spoiled before the rest come up. The putting collars with

Boat.
Boat.

with bells about the dogs necks is a great security for them; for the boar will not so soon strike at them when they have these, but will rather run before them. The huntsmen generally kill the boar with their swords or spears; but great caution is necessary in making the blows; for he is very apt to catch them upon his snout or tusks; and if wounded and not killed, he will attack the huntsman in the most furious manner. The places to give the wound with the spear is either between the eyes in the middle of the forehead, or in the shoulder; both these places make the wound mortal.

When this creature makes at the hunter, there is nothing for it but courage and address; if he flies for it, he is surely overtaken and killed. If the boar comes straight up, he is to be received at the point of the spear: but if he makes doubles and windings, he is to be watched very cautiously; for he will attempt getting hold of the spear in his mouth; and if he does so, nothing can save the huntsman but another person attacking him behind: he will on this attack the second person, and the first must then attack him again: two people will thus have enough to do with him; and were it not for the forks of the boar-spears that make it impossible to press forward upon them, the huntsman who gives the creature his death's wound would seldom escape falling a sacrifice to his revenge for it. The modern way of boar-hunting is generally to dispatch the creature by all the huntmen striking him at once: but the ancient Roman way was, for a person on foot, armed with a spear, to keep the creature at bay; and in this case the boar would run of himself upon the spear to come at the huntsman, and push forward till the spear pierced him through.

The hinder claws of a boar are called *guards*. In the corn, he is said to *feed*; in the meadows or fallow-lands, to *root*, *worm*, or *fern*; in a close, to *graze*. The boar is farrowed with as many teeth as he will ever have; his teeth increasing only in bigness, not in number: among these there are four called *tushes*, or *tusks*; the two biggest of which do not hurt when he strikes, but serve only to whet the other two lowest, with which the beast defends himself, and frequently kills, as being greater and longer than the rest.

It is very remarkable, that these creatures in the West Indies are subject to the stone: few of them are absolutely free from it, yet scarce any have the stones of any considerable size. It is common to find a great number in the same bladder; and they are usually of about a scruple weight, and are angular, and that with great regularity, each having five angles.

Among the ancient Romans, boar's flesh was a delicacy; a boar served up whole was a dish of state.

The boar was sometimes also the military ensign borne by the Roman armies, in lieu of the eagle.

Among physicians, a boar's bladder has been reputed a specific for the epilepsy. The tusk of the wild boar still passes with some as of great efficacy in quinseys and pleurisy.

BOARD, a long piece of timber, sawed thin for building and several other purposes. See **TIMBER**.

Deal-boards are generally imported into England ready sawed, because done cheaper abroad, in regard we want saw-mills. Cap-boards are imported from Sweden and Dantzic. Oak-boards chiefly from Sweden and Holland; some from Dantzic. We also im-

port white boards for shoemakers; mill and scale-boards, &c. for divers artificers. Scale-board is a thinner sort, used for the covers of primers, thin boxes, and the like. It is made with large panels; but might probably be sawed with mills to advantage.

BOARD is also used for a kind of table or bench, whereon several artificers perform their work. In this sense, we say a work-board, shop-board, tailor's-board, &c.

BOARD is also used for a flat machine, or frame, used in certain games, and the like. In this sense, we say a draught-board, a chess-board, a shovel-board, and the like.

BOARDS, in book-binding See **BOOK-BINDING**.

BOARD, Bureau, is also used for an office where accounts are taken, payments ordered, and the like. In this sense, we say the board of works, board of ordnance, board of treasury, and the like.

BOARD, among seamen. *To go aboard*, signifies to go into the ship. *To slip by the board*, is to slip down by the ship's side. *Board and board*, is when two ships come so near as to touch one another, or when they lie side by side. *To make a board*, is to turn to windward; and the longer your boards are, the more you work into the wind. *To board it up*, is to beat it up, sometimes upon one tack, and sometimes upon another. *She makes a good board*, that is, the ship advances much at one tack. *The weather-board*, is that side of the ship which is to windward.

BOARDING, in a naval engagement, a desperate and furious assault made by one ship on another, after having found every other method to reduce her ineffectual: it may be performed in different places of the ship, according to their circumstances and situation, by the assailant detaching a number of men armed with pistols and cutlasses on the decks of his antagonist, who stands in the same predicament with a city stormed by the besiegers. This expedient, however, is rarely attempted by king's ships, which generally decide the combat without grappling each other; but chiefly practised by privateers, which, bearing down on the enemy's quarter or broadside, drop from the bowsprit, which projects over the defendant's deck, an earthen shell, called a *sink-pot*, charged with fiery and suffocating combustibles, which immediately bursts, catches fire, and fills the deck with insufferable stench and smoke: in the middle of the confusion thus occasioned, the privateer's crew rush aboard, under cover of the smoke, and easily overpower the astonished enemy; unless they have close quarters to which they can retreat and beat them off the decks.

BOAT, a small open vessel, conducted on the water by rowing or sailing. The construction, machinery, and even the names of boats, are very different, according to the various purposes for which they are calculated, and the services on which they are to be employed. Thus they are occasionally slight or strong, sharp or flat bottomed, open or decked, plain or ornamented; as they may be designed for swiftness or burden, for deep or shallow water, for sailing in a harbour or at sea, and for convenience or pleasure.

The largest boat that usually accompanies a ship is the *long-boat*, which is generally furnished with a mast and sails: those which are fitted for men of war, may be occasionally decked, armed, and equipped, for cruising

Board
Boat.

cruising short distances against merchant-ships of the enemy, or smugglers, or for impressing seamen, &c. The *barges* are next in order, which are longer, slighter, and narrower: they are employed to carry the principal sea-officers, as admirals, and captains of ships of war, and are very unfit for sea. *Pinnaces* exactly resemble barges, only that they are somewhat smaller, and never row more than eight oars; whereas a barge properly never rows less than ten. These are for the accommodation of the lieutenants, &c. *Cutters* of a ship, are broader, deeper, and shorter, than the barges and pinnaces; they are fitter for sailing, and are commonly employed in carrying stores, provisions, passengers, &c. to and from the ship. In the structure of this sort of boats, the lower-edge of every plank in the side overlays the upper edge of the plank below, which is called by ship-wrights *clinch-work*. *Yaws* are something less than cutters, nearly of the same form, and used for similar services; they are generally rowed with six oars.

The above boats more particularly belong to men of war; as merchant-ships seldom have more than two, viz. a long-boat and yawl: when they have a third, it is generally calculated for the countries to which they trade, and varies in its construction accordingly. Merchant-ships employed in the Mediterranean find it more convenient to use a *lanch*, which is longer, more flat-bottomed, and better adapted every way to the harbours of that sea, than a long-boat.

A *wherry* is a light sharp boat, used in a river or harbour for carrying passengers from place to place. *Punts* are a sort of oblong flat-bottomed boats, nearly resembling floating stages; they are used by ship-wrights and caulkers, for breaming, caulking, or repairing a ship's bottom. A *mofes* is a very flat broad boat, used by merchant-ships amongst the Caribbee-islands, to bring hogheads of sugar off from the sea-beach to the shipping which are anchored in the roads. A *felucca* is a strong passage-boat used in the Mediterranean, from 10 to 16 banks of oars. The natives of Barbary often employ boats of this sort as cruisers.

For the larger sort of boats, see the articles CRAFT, CUTTER, PERIAGUA, and SHALLOP.

Of all the small boats, a *Norway yawl* seems to be the best calculated for a high sea, as it will often venture out to a great distance from the coast of that country, when a stout ship can hardly carry any fail.

An account of several trials made on a BOAT, or Sloop, fit for inland navigation, coasting voyages, and short passages by sea, which is not, like ordinary vessels, liable to be overjet or sunk by winds, waves, water-spouts, or too heavy a load; contrived and constructed by Monsieur Bernieres, director of the bridges and causeways in France, &c. &c. Some of these trials were made on the first of August 1777, at the gate of the invalids in Paris, in the presence of the provost of the merchants, of the body of the town, and a numerous concourse of spectators of all conditions.

The experiments were made in the way of comparison with another common boat of the same place, and of equal size. Both boats had been built ten years, and their exterior forms appeared to be exactly similar. The common boat contained only eight men, who rocked it and made it incline so much to one side, that it presently filled with water, and sunk; so that the

men were obliged to save themselves by swimming; a thing common in all vessels of the same kind, either from the imprudence of those who are in them, the strength of the waves or wind, a violent or unexpected shock, their being overloaded, or overpowered in any other way.

The same men who had just escaped from the boat which sunk, got into the boat of M. Bernieres; rocked it; and filled it, as they had done the other, with water. But, instead of sinking to the bottom, though brim full, it bore being rowed about the river, loaded as it was with men and water, without any danger to the people in it.

M. Bernieres carried the trial still farther. He ordered a mast to be erected in this same boat, when filled with water; and to the top of the mast had a rope fastened, and drawn till the end of the mast touched the surface of the river, so that the boat was entirely on one side, a position into which neither winds nor waves could bring her: yet, as soon as the men who had hauled her into this situation let go the rope, the boat and mast recovered themselves perfectly in less than the quarter of a second; a convincing proof that the boat could neither be funk nor overturned, and that it afforded the greatest possible security in every way. These experiments appeared to give the greater pleasure to the public, as the advantages of the discovery are not only so sensible, but of the first importance to mankind.

A boat of the same sort had been tried, October 11th, 1771, at Choisy, before Lewis XV. and his present majesty, then Dauphin, &c. to whom M. Bernieres, as much distinguished by his disinterestedness and his virtues as a citizen, as by his inventive genius, referred for the satisfactory result of the experiments.

In consequence of the above trials, the provost of the merchants, and the corporation of Paris, at their meeting on the 20th of September, gave the Sieur de Bernieres permission to establish his boats on the river Seine, at the port near Pont-Royal; and moreover promised him all the protection and encouragement in their power. And the Sieur de Bernieres, on his side, proposes to supply the public with a certain number of these boats before the end of next year.

The known humanity of the inventor warrants the pleasing belief, that this very capital discovery will neither be unnecessarily concealed, nor illiberally restricted. It is due to mankind; and we doubt not but that its importance will be enhanced by an early, free, and extensive communication.

In Britain especially, where so much business of every kind is transacted on the water, we must more anxiously wish to derive from the ingenuity and benevolence of the Sieur Bernieres, a comfortable resource against the many distressful and dangerous accidents to which we are perpetually exposed.

BOATSWAIN, the officer who has the boats, sails, rigging, colours, anchors, and cables, committed to his charge.

It is the duty of the boatswain particularly to direct whatever relates to the rigging of a ship, after she is equipped from a royal dock-yard. Thus he is to observe that the masts are properly supported by their shrouds, stays, and back-stays, so that each of those ropes may sustain a proportional effort when the mast is strained by the violence of the wind, or the agitation

Boatswain
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Boccace.

of the ship. He ought also to take care that the blocks and running-ropes are regularly placed, so as to answer the purposes for which they are intended; and that the sails are properly fitted to their yards and stays, and well furled or reefed when occasion requires.

It is likewise his office to summon the crew to their duty; to assist with his mates in the necessary business of the ship; and to relieve the watch when it expires. He ought frequently to examine the condition of the masts, sails, and rigging; and remove whatever may be judged unfit for service, or supply what is deficient; and he is ordered by his instructions to perform this duty with as little noise as possible.

BOATSWAIN'S *Mate* has the peculiar command of the long boat, for the setting forth of anchors, weighing or fetching home an anchor, warping, towing, or mooring; and is to give an account of his store.

BOB, a term used for the ball of a short pendulum.

BOBARTIA, in botany, a genus of the digynia order, belonging to the triandria class of plants. Of this genus there is only one species known, which is a native of the Indies, and hath no remarkable property.

BOBBIN, a small piece of wood turned in the form of a cylinder, with a little border jutting out at each end, bored through to receive a small iron pivot. It serves to spin with the spinning-wheel, or to wind thread, worsted, hair, cotton, silk, gold, and silver.

BOBBING, among fishermen, a particular manner of catching eels, different from snigging. Bobbing for eels is thus performed: They scour well some large lobs, and with a needle run a twisted silk through them from end to end, taking so many as that they may wrap them about a board a dozen times at least: then they tie them fast with the two ends of the silk, that they may hang in so many hanks; which done, they fasten all to a strong cord, and, about an handful and an half above the worms, fix a plummet three-quarters of a pound weight, and make the cord fast to a strong pole. With this apparatus fishing in muddy water, they feel the eels tug lustily at the bait; when they think they have swallowed it sufficiently, they gently draw up the rope to the top, and bring them ashore.

BOBIO, an episcopal town of Italy, in the Milanese and territory of Pavia, seated on the river Treba, in E. Long. 9. 30. N. Lat. 44. 38.

BOCA-CHICA, the freight or entrance into the harbour of Carthage in South America. It is defended by several forts belonging to the Spaniards, all which were taken by the English in 1741; they were nevertheless obliged to raise the siege of Carthage in a short time after.

Boca-del-Drago, a freight so called, between the island of Trinidad and Andalusia, in the province of Terra Firma in South America.

BOCANUM, (anc. geog.), a town of Mauritania Tingitana, to the south of mount Atlas; said to be that of Morocco in Africa. W. Long. 9. 0. N. Lat. 31. 0.

BOCCACE (John), one of the most polite and learned writers of his age, was born in Tuscany in 1313. His father first placed him with a merchant; but as he gave signs of genius, he was put afterward to study the canon law: he lost almost as much time at this as at the last occupation; and thought of nothing but poetry. He came under the instruction of Petrarch; but did not so entirely devote himself to

poetry, as to forget other studies. In the prosecution of these, however, as he fought every where for the best masters, and had not an income sufficient for his expenses, he was reduced to such circumstances as to stand in need of the bounty of others: he was particularly obliged to Petrarch, who furnished him with money as well as books, and assisted him in many other respects. Boccace was a great admirer of the Greek language: he found means to get Homer translated into Latin for his own use; and procured a professor's chair at Florence for Leontius Pylatus, in order to explain this poet. The republic of Florence honoured Boccace with the freedom of that city; and employed him in public affairs, particularly to negotiate the return of Petrarch: but this poet not only refused to return to Florence, but persuaded Boccace also to retire from thence, on account of the factions which prevailed in that republic. Having quitted Florence, he went to several places in Italy; and stopped at last at the court of Naples, where king Robert gave him a very kind reception. He conceived a violent affection for the natural daughter of that prince, which made him remain a considerable time at Naples. He also made a long stay in Sicily, where he was in high favour with queen Joan. He returned to Florence when the troubles were a little appeased: but not liking the course of life he must have followed there, he retired to Certaldo; and, far from the noise of business, he spent his time in study agreeably to his own humour. His great application brought on him an indisposition, of which he died in 1376. He wrote several books, some learned and serious, others of gallantry and full of stories. It is by his *Decamerone* chiefly that he has immortalized himself. Petrarch found so many charms in this composition, that he was at the pains to translate it into Latin for his own satisfaction.

BOCCALINI (Trajan), a celebrated satirical writer, born at Rome, who, in the beginning of the 17th century, obtained the admiration of all Italy by his refined and delicate criticisms. Sovereign princes themselves did not escape the lash of his satire. The cardinals Borghese and Cætan having declared themselves his protectors, he published his *Ragguaglio di Parnasso*, and *La Segretaria di Apollo*, which is the continuation of the former. These two works were received by the public with uncommon applause. He there feigns, that Apollo, holding his court at Parnassus, heard the complaints of the whole world, and did justice according as the cases required. He at length printed his *Pietra di Parangone*; wherein he attacks the court of Spain, setting forth their designs against the liberty of Italy, and inveighing particularly against them for the tyranny they exercised in the kingdom of Naples. The Spaniards complained of him in form, and were determined at any rate to be revenged. Boccacini was frightened, and retired to Venice; but was there assassinated in a very strange manner. He lodged with one of his friends, who having got up early one morning, left Boccacini in bed: a minute after, some armed men entered his chamber, and gave him so many blows with bags full of sand, that they left him for dead; so that his friend returning some time after, found him speechless. Great search was made at Venice for the authors of this murder; and though they were never discovered, it was universally believed that they were employed by the

Boccace
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Boccacini

Bocconi
Bochart.

the court of Spain.

BOCCONI (Sylvio), a celebrated natural historian, born at Palermo in Sicily. After he had gone through the usual course of studies, he applied himself chiefly to natural history, in which he made a most surprising progress. He was afterwards ordained priest, and entered into the Cistercian order, at which time he changed his Christian name *Paul* into that of *Sylvio*. This new way of life did not in the least divert him from his favourite study: for he pursued it with greater vigour than ever, and travelled not only over Sicily, but likewise visited the isle of Malta, Italy, the Low Countries, England, France, Germany, Poland, and several other nations; and, in 1696, was admitted a member of the academy of the virtuosi in Germany. Upon his return to Sicily, he retired to a convent of his own order near Palermo; where he died in 1704, being 71 years of age. He left many curious works.

BOCCONIA, (so called from the Rev^d Paul Bocconi of Sicily, who published some curious books on botany), GREATER TREE CELANDINE; a genus of the monogynia order, belonging to the doceandria class of plants. Of this genus there is but one known species, viz. the frutescens, which is esteemed for the beauty of its large foliage. It is very common in Jamaica and other warm parts of America, where it grows to the height of 10 or 12 feet, having a straight trunk as large as a man's arm, and covered with a white smooth bark. At the top it divides into several branches, on which the leaves are placed alternately. These leaves are eight or nine inches long, and five or six broad; are deeply sinuated, sometimes almost to the midrib; and are of a fine glaucous colour. The whole plant abounds with a yellow juice of an acrid nature; so that it is used by the inhabitants of America to take off warts and spots from the eyes. The singular beauty of this plant renders it worthy of a place in every curious collection: and it seems the Indians are very fond of it; for Hernandez tells us, their kings used to plant it in their gardens. It is propagated by seeds from America, sowing them in spring, in pots of light earth, which must be plunged in a hot-bed. When the plants come up, they are to be put in separate pots, which must always be kept in the stove.

BOCHART (Samuel), one of the most learned men in the 17th century, was born at Roan in Normandy. He made a very early progress in learning, and became a great proficient in the oriental languages. He was many years pastor of a protestant church at Caen; where he was tutor to Wentworth Dillon earl of Roscommon, author of the *Essay on Translated Verse*. Here he particularly distinguished himself by his public disputations with father Veron, a very famous controversialist. The dispute was held in the castle of Caen, in the presence of a great number of Catholics and Protestants. Bochart came off with great honour and reputation; which were not a little increased in the year 1646, upon the publication of his *Phaleg* and *Canaan*, which are the titles of the two parts of his *Geographica Sacra*. He acquired also great fame by his *Hierozoicon*, printed in London in 1675. This treats of *animalibus sacra scriptura*. The great learning he displayed in his works rendered him esteemed not only amongst those of his own profession, but amongst all lovers of knowledge of whatever denomination. In 1652, the queen

of Sweden invited him to Stockholm, where she gave him many proofs of her regard and esteem.

At his return to Caen, he resumed the functions of the ministry, and was received into the academy of that city. His learning was not his principal qualification, he had a modesty equal to it; and hence enjoyed his great reputation in tranquillity, sheltered from those unhappy quarrels which so many other learned men draw upon themselves. He died suddenly while he was speaking in the above academy, on the 16th of May, 1667, aged 78. A complete edition of his works was published in Holland, in two volumes folio, 1712.

BOCHIUUS, or *Bocquius* (John), a Latin poet, born at Brussels in 1555. He travelled into Italy, Germany, Poland, and Muscovy, and at his return became secretary to the duke of Parma. He died on the 13th of January, 1609. The critics in the Netherlands set so great a value on his poetry, that they gave him the name of the *Belgic Virgil*. He wrote, 1. *De Belgii Principatu*. 2. *Paredia Heroica Psalmorum Davidicorum*. 3. *Observationes Physicæ, Ethicæ, Politicæ, et Historicæ, in Psalmos*. 4. *Vita Davidis*. 5. *Orationes*. 6. *Poemata*.

BOCHETTA, a place of Italy, famous in the war of 1746 and 1747. It is a chain of mountains over which the great road lies from Lombardy to Genoa; and on the very peak of the highest mountain is a narrow pass, which will hardly admit three men to go abreast. This pass is properly called the *Bochetta*; for the defence of which there are three forts. It is the key of the city of Genoa; and was taken in 1746 by the Imperialists, by which means they opened a way to that city.

BOCKHOLT, a town of Germany in the circle of Westphalia and diocese of Munster, capital of a small district, and subject to the bishop of Munster. E. Long. 6. 20. N. Lat. 51. 40.

BOCKING, a very large village of Essex in England, adjoining to Brain-tree, from which it is separated only by a small stream. Its church is a deanry, and very large; and there are here two or three meeting houses; but the market is kept at Brain-tree. In both parishes there are about 1500 houses, which in general are but indifferent, and the streets narrow and badly paved. There is a large manufactory of bays, chiefly for exportation. It is 42 miles north-east of London.

BOCK-LAND, in the Saxons time, is what we now call *freehold land*, held by the better sort of persons by charter or deed in writing; by which name it was distinguished from *folkland*, or copy-hold land, holden by the common people without writing.

BODERIA, or *BODOTRIA*, the ancient name for the frith of Forth in Scotland.

BODIN (John), native of Angers, one of the ablest men in France in the 16th century, famous for his *Method of History*, his *Republic*, and other works. He was in great favour with Henry III. who imprisoned John de Serre for writing an injurious piece against Bodin, and forbid him upon pain of death to publish it. But his favour was not of long continuance. The duke of Alençon, however, gave him several employments; and carried him to England with him as one of his counsellors, where he had the pleasure and glory to see his books *de Republica* read publicly in the

Bochius
Bodin.

Bodkin
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Bodley.

Bodmin
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Boece.

university of Cambridge, having been translated into Latin by the English. He had written them in French. In the Raggugli of Boccalini he is condemned as an atheist to the fire, for having said in his books that liberty of conscience ought to be granted to sectaries. He declared himself pretty freely against those who asserted that the authority of monarchs is unlimited; but yet he displeased the republicans. Upon the death of the duke of Alençon, Bodin retired to Laon, where he married. He had an office in the presidial of this city; and in Charles the Ninth's time he was the king's solicitor with a commission for the forests of Normandy. He died of the plague at Laon, in 1596.

BODKIN, a small instrument made of steel, bone, ivory, &c. used for making holes.

BODLEY (Sir Thomas), founder of the Bodleian library at Oxford, was born at Exeter in Devonshire, in 1544. When he was about 12 years of age, his father, Mr John Bodley, being a Protestant, was obliged to leave the kingdom. He settled at Geneva with his family, and continued there till the death of Queen Mary. In that university, then in its infancy, young Bodley studied the learned languages, &c. under several eminent professors. On the accession of Queen Elizabeth, he returned with his father to England; and was, soon after, entered of Magdalen college in Oxford. In 1563, he took the degree of bachelor of arts, and the year following was admitted fellow of Merton college. In 1565, he read a Greek lecture in the hall of that college. He took a master of arts degree the year after, and read natural philosophy in the public schools. In 1569, he was one of the proctors of the university, and, for some time after, officiated as public orator. In the year 1576, he quitted Oxford, and made the tour of Europe; but returned to his college after four years absence.

He became gentleman usher to Queen Elizabeth, in the year 1583; and in 1588 he married the widow of Mr Ball, daughter of Mr Carew of Bristol, a lady of considerable fortune. Mr Bodley was soon after sent ambassador to the king of Denmark, and other German princes. He was next charged with an important commission to Henry III. of France; and, in 1588, went ambassador to the United Provinces, where he continued till the year 1597.

On his return to England, finding his preferment obstructed by the jarring interests of Burleigh and Essex, he retired from court, and could never afterwards be prevailed on to accept of any employment. He now began the foundation of the Bodleian library, which was completed in 1599. Soon after the accession of King James I. he received the honour of knighthood, and died in the year 1612. He was buried in the choir of Merton college. His monument is of black and white marble, on which stands his effigy in a scholar's gown, surrounded with books. At the four corners are the emblematical figures of Grammar, Rhetoric, Music, and Arithmetic; two angels, &c.; with a short inscription, signifying his age and time of his death. Sir Thomas Bodley was a pious scholar, an able statesman, and a worthy man. Mr Granger observes, that he merited much as a man of letters; but incomparably more in the ample provision he made for literature, in which he stands unrivalled; and that his library is a mausoleum which will perpetuate his memory as long

as books themselves endure. Sir Thomas wrote his own Life to the year 1609; which, together with the first draught of the Statutes, and his Letters, have been published from the originals in the Bodleian library, by Mr Thomas Hearn, in 1703.

BODMIN, a town of Cornwall in England, seated in a bottom between two high hills, which renders the air very unwholesome. It consists chiefly of one street, and the many decayed houses shew that it has once been a place of greater note. It is a mayor-town, sends two members to parliament, and had formerly the privilege of the coinage of tin. W. Long. 4. 5. N. Lat. 50. 32.

BODON, a fortified town of Bulgaria in Turkey in Europe, with an archbishop's see. It is seated on the Danube, in E. Long. 45. 24. N. Lat. 45. 10.

BODROCH, a town of Hungary, seated on the north-east shore of the river Danube, in E. Long. 20. 20. N. Lat. 46. 15.

BODY, in physics, an extended solid substance, of itself utterly passive and inactive, indifferent either to motion or rest.

Colour of BODIES. See CHROMATICS.

Body, with regard to animals, is used in opposition to soul, in which sense it makes the subject of anatomy. The height of the human body is said to be different in different parts of the day; ordinarily it is an inch more in the morning than at night †. The body ceases to grow in height, when the bones are arrived at a degree of firmness and rigidity which will not allow of farther extension by the effort of the heart and motion of the blood.

Body, among painters, as to *bear a body*, a term signifying that the colours are of such a nature, as to be capable of being ground so fine, and mixing with the oil so entirely, as to seem only a very thick oil of the same colour.

Body, in the menage. A horse is chiefly said to have a *good body*, when he is full in the flank. If the last of the short ribs be at a considerable distance from the haunch bone, although such horses may for a time have pretty good bodies, yet, if they are much laboured, they will lose them; and these are properly the horses that have no flank. It is also a general rule, that a man should not buy a light bodied-horse, and one that is fiery, because he will soon destroy himself.

Body, in the art of war, a number of forces, horse and foot, united and marching under one commander.

Main Body of an army, the troops encamped in the centre between the two wings, and generally infantry; the other two bodies are the vanguard and the rear-guard; these being the three into which an army, ranged in order of battle, is divided.

Body, in matters of literature, denotes much the same with system, being a collection of every thing belonging to a particular science or art, disposed in proper order: thus we say, a body of divinity, law, physics, &c.

Body-Corporate. See CORPORATION.

BOECE, or **BOETHIUS**, (Hector), the historian, was born at Dundee about the year 1470, and studied with applause in the university of Paris. It was there he became acquainted with Erasmus, and laid the foundation of a friendship which was so honourable to him. In 1500 he

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he was recalled to Aberdeen by bishop Elphington, who made him principal of that university. Gratitude for this promotion engaged him to write with particular attention the Life of that prelate. It appeared in his history of the diocese of Aberdeen; and may be considered, perhaps, as the most valuable portion of that work. His history of Scotland, a more useful undertaking, was first published in the 1526. In 1574, it underwent a second impression, and was enriched with the 18th book, and a part of the 19th. A farther continuation of it was executed by Joannes Ferrerius Pedemontanus. Boece died about the year 1550. He has been compared, and not without reason, to Geoffroy of Monmouth. He had a propensity to fable and exaggeration; a fault which the elegance of his expression does not compensate. His judgment was not equal to his genius; and his fictions as an historian are a contrast to his probity as a man. John Ballenden, archdeacon of Murray, translated his history into the Scottish language, at the desire of James V. This translation William Harrison converted, though with imperfections, into English; and his associate Hollingshed published his work in his chronicle, with additions and improvements by the ingenious Francis Thynne.

BOEDROMIA, in antiquity, solemn feasts held at Athens in memory of the succour brought by Ion to the Athenians, when invaded by Eumolpus son of Neptune, in the reign of Erechtheus. Plutarch gives another account of the boedromia; which, according to him, were celebrated in memory of the victory obtained by Theseus over the Amazons, in the month Boedromion.

BOEDROMION, in chronology, the third month of the Athenian year, answering to the latter part of our August and beginning of September.

BOEHMEN (Jacob), called the *Teutonic philosopher*, was a noted visionary of the 17th century, born in a village of Germany near Gorlitz, in 1575. He was bred a shoemaker; and marrying, supported a large family by this occupation; until, after amusing himself with chemistry, a visionary turn of mind, heated by sermons and German divinity, got the upper hand of his common sense, and produced raptures and notions of divine illumination. These he first gave vent to in 1612, by a treatise intitled *Aurora, or the rising of the Sun*; being a mixture of astrology, philosophy, chemistry, and divinity, written in a quaint obscure style. This being censured by the magistrates of Gorlitz, he remained silent for seven years: but improving that interval by pursuing the flights of his imagination, he resumed his pen; and resolving to redeem the time he had lost, he, in the remaining five years of his life, published above 20 books, which greatly needed what he concluded with, *A table of his principles, or a key to his writings*; though this has not proved sufficient to render them intelligible to common apprehensions. The key above mentioned appeared in 1624, and he did not long survive it. For early in the morning of the 18th of November, that year, he called one of his sons, and asked him "if he also heard that excellent music;" to which being answered in the negative, he ordered the door to be set open, that the music might be the better heard. He asked afterwards, what a clock it was; and being told it had struck two, he said "It is not yet my time, my time is three hours

hence." In the interim he was heard to speak these words, "O thou strong God of hosts, deliver me according to thy will. O thou crucified Lord Jesus, have mercy upon me, and receive me into thy kingdom." When it was near six o'clock, he took his leave of his wife and sons, and blessed them, and said, "Now I go hence into paradise;" then bidding his son turn him, he immediately expired his last breath in a deep sigh.

A great number of persons have been inveigled by the visions of this fanatic, notwithstanding his talents in involving the plainest things in mystery and enigmatical jargon. Among others, the famous Quirinus Kahlman may be reckoned the principal of his followers in Germany; who says, he had learned more being alone in his study, from Boehmen, than he could have learned from all the wise men of that age together; and, that we may not be in the dark as to what sort of knowledge this was, he acquaints us, that amidst an infinite number of visions it happened, that, being snatched out of his study, he saw thousands of thousands of lights rising round about him. Nor has he been without admirers, and those in no small number, in England; among the foremost of whom stands the famous Mr William Law, author of *Christian Perfection*, &c. who has favoured his countrymen with an English edition of Jacob Boehmen's works in 2 vols 4to.

BOEOTIA, the name of two ancient kingdoms, one of which was founded or rather restored by Cadmus, and named by him *Boetia*, from the ox which is said to have directed him to the place where he built the capital of his new kingdom, better known afterwards by the name of *Thebes*. But as the inhabitants were scarce ever distinguished as a nation by the name of *Boeotians*, but of *Thebans*, we refer to the article THEBES, for their history, &c.

The other Boetia was in Thessaly, and is said to have been founded by Boeotus the son of Neptune and brother of Æolus, by Arne the daughter of Æolus king of Æolis. This last, having sent his daughter to Metapontium a city of Italy, she was there delivered of those two sons, the eldest of whom she called after her father's name *Æolus*; and he possessed himself of the islands in the Tyrrhenian, now the Tuscan sea, and built the city of Lipara. Boeotus the younger son went to his grandfather and succeeded him in his kingdom, called it after his own name, and the capital city *Arne*, from his mother. All that we know of these Boeotians is, that they held this settlement upwards of 200 years; and that the Thessalians expelled them from it; upon which they came and took possession of that country, which till then had been called *Cadmeis*, and gave it the name of *Boetia*. Diodorus and Homer tell us, that these Boeotians signalized themselves at the Trojan war; and the latter adds, that five of Boeotus's grandsons, viz. Peneleus, Leitus, Prothenor, Arcefilaus, and Clonius, were the chiefs who led the Boeotian troops thither.

BOERHAAVE (Herman), one of the greatest physicians as well as the best men, that this or perhaps any age has ever produced, was born, in 1668, at Vorhout, a village near Leyden. At the age of 16, he found himself without parents, protection, advice, or fortune. He had already studied theology, and the other ecclesiastical sciences, with the design of devoting himself to a clerical life; but the science of nature, which

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Boerhaave.

which equally engaged his attention, soon engrossed his whole time. This illustrious person, whose name afterwards spread throughout the world, and who left at his death above L. 200,000, could at that time barely live by his labours, and was compelled to teach the mathematics to obtain necessaries. But in 1693, being received doctor in the science of physic, he began practice; and his merit being at length discovered, many powerful friends patronized him, and procured him three valuable employments: the first was that of professor of medicine in the university of Leyden; the second, that of professor of chemistry; and, thirdly, that of professor of botany. The Academy of Sciences at Paris, and the Royal Society at London, invited him to become one of their members. He communicated to each his discoveries in chemistry. The city of Leyden became in his time the school of Europe for this science, as well as medicine and botany. All the princes of Europe sent him disciples, who found in this skilful professor, not only an indefatigable teacher, but even a tender father, who encouraged them to pursue their labours, consoled them in their afflictions, and soled them in their wants.

When Peter the Great went to Holland in 1715, to instruct himself in maritime affairs, he also attended Boerhaave to receive his lessons.

His reputation was spread as far as China: a Mandarin wrote to him with this inscription, "To the illustrious Boerhaave, physician in Europe;" and the letter came regularly to him.

The city of Leyden has raised a monument in the church of St Peter, to the salutary genius of Boerhaave, *Salutifero Boerhaavii genio sacrum*. It consists of an urn upon a pedestal of black marble: six heads, four of which represent the four ages of life, and two the sciences in which Boerhaave excelled, form a group issuing between the urn and its supporters. The capital of this basis is decorated with a drapery of white marble, in which the artist has shewn the different emblems of disorders and their remedies. Above, upon the surface of the pedestal, is the medallion of Boerhaave: at the extremity of the frame, a ribbon displays the favourite motto of this learned man; *Simplex vigilum veri*, "Truth unrarayed."

From the time of the learned Hippocrates, no physician has more justly merited the esteem of his contemporaries, and the thanks of posterity, than Boerhaave. He united to an uncommon genius, and extraordinary talents, the qualities of the heart, which give them so great a value to society. He made a decent, simple, and venerable appearance, particularly when age had changed the colour of his hair. He was an eloquent orator, and declaimed with dignity and grace. He taught very methodically, and with great precision; he never tired his auditors, but they always regretted that his discourses were finished. He would sometimes give them a lively turn with raillery; but his raillery was refined and ingenious, and it enlivened the subject he treated of, without carrying with it any thing severe or satirical. A declared foe to all excess, he considered decent mirth as the salt of life. It was the daily practice of this eminent person, through his whole life, as soon as he rose in the morning, which was generally very early, to retire for an hour to private prayer, and meditation on some part of the Scriptures. He often

told his friends, when they asked him how it was possible for him to go through so much fatigue? that it was *this* which gave him spirit and vigour in the business of the day. *This* he therefore recommended as *the best rule* he could give: for nothing, he said, could tend more to the health of the body, than the tranquillity of the mind; and that he knew nothing which could support himself, or his fellow-creatures, amidst the various distresses of life, but a well-grounded confidence in the supreme Being upon the principles of Christianity. This was strongly exemplified in his own illness in 1722, which can hardly be told without horror; and by which the course of his lectures as well as his practice was long interrupted. He was for five months confined to his bed by the gout, where he lay upon his back without daring to attempt the least motion; because any effort renewed his torments, which were so exquisite, that he was at length not only deprived of motion but of sense. Here his medical art was at a stand; nothing could be attempted, because nothing could be proposed with the least prospect of success. But, having (in the sixth month of his illness) obtained some remission, he determined to try whether the juice of fumitory, enlive, or succory, taken thrice a-day in a large quantity, (*viz.* above half a pint each dose), might not contribute to his relief; and by a perseverance in this method he was wonderfully recovered. This patience of Boerhaave's was founded not on vain reasonings, like that of which the Stoics boasted; but on a religious composure of mind, and Christian resignation to the will of God.

Of his sagacity and the wonderful penetration with which he often discovered and described, at the first sight of a patient, such distempers as betray themselves by no symptoms to common eyes, such surprising accounts have been given, as scarcely can be credited, tho' attested beyond all doubt. Yet this great master of medical knowledge was so far from a presumptuous confidence in his abilities, or from being puffed up by his riches, that he was condescending to all, and remarkably diligent in his profession; and he often used to say, that the life of a patient (if trifled with or neglected) would one day be required at the hand of the physician. He always called the poor his *best patients*; for God (said he) is their paymaster.

The activity of his mind sparkled visibly in his eyes. He was always cheerful, and desirous of promoting every valuable end of conversation; and the excellency of the Christian religion was frequently the subject of it: for he asserted, on all proper occasions, the divine authority and sacred efficacy of the Scriptures; and maintained, that they only could give peace of mind, that sweet and sacred peace which passeth all understanding; since none can conceive it, but he who has it; and none can have it, but by divine communication. He never regarded calumny nor detraction, (for Boerhaave himself had enemies), nor ever thought it necessary to confute them. "They are sparks (said he) which, if you do not blow, will go out of themselves. The surest remedy against scandal, is to *live it down* by a perseverance in well-doing; and by praying to God that he would cure the disordered minds of those who traduce and injure us."

Being once asked by a friend, who had often admired his patience under great provocations, whether he

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knew what it was to be angry, and by what means he had so entirely suppressed that impetuous and ungo-vernable passion? he answered, with the utmost frank-ness and sincerity, that he was naturally quick of re-sentment, but that he had, by daily prayer and medi-tation, at length attained to this mastery over himself.

About the middle of the year 1737, he felt the first approaches of that fatal illness which brought him to the grave, viz. a disorder in his breast, which was at times very painful, often threatened him with im-me-diate suffocation, and terminated in an universal drop-sy; but during this afflictive and lingering illness, his constancy and firmness did not forsake him. He nei-ther intermitted the necessary cares of life, nor forgot the proper preparations of death. About three weeks before his dissolution, when the Rev. Mr Schultens, one of the most learned and exemplary divines of the age, attended him at his country-house, the Doctor desired his prayers, and afterwards entered into a most re-markably judicious discourse with him on the spiritual and immaterial nature of the soul; and this he illus-trated to Mr Schultens with wonderful perspicuity, by a description of the effects which the infirmities of his body had upon his faculties; which yet they did not so oppress or vanquish, but his soul was always master of itself, and always resigned to the pleasure of its ma-ker—and then he added, “ He who loves God ought to think nothing desirable but what is most pleasing to the supreme goodness.” These were his sentiments, and such was his conduct in this state of weakness and pain. As death approached nearer, he was so far from terror or confusion, that he seemed less sensible of pain, and more cheerful under his torments, which continued till the 23^d day of September, 1738, on which he died (much honoured and lamented) between four and five in the morning, in the 70th year of his age—often re-commending to the by-standers a careful observation of St John’s precepts concerning the love of God, and the love of man, as frequently inculcated in his first epistle, particularly in the fifth chapter.

His funeral oration was spoken in Latin before the university of Leyden, to a very numerous audience, by Mr Schultens, and afterwards published at their particu-lar desire.

He wrote, 1. *Institutiones Medicæ*. 2. *Aphorismi de cognoscendis & curandis Morbis*. 3. *Institutiones & Experimenta Chemicæ*. 4. *Libellus de Materia Medica, et remedium formulæ que servant aphorismi*. Swie-tent published *Commentaries upon his Aphorismi*, in 5 vols 4to; and several other works, all greatly es-teemed.

BOERHAAVIA, a genus of the monogynia or-der, belonging to the monandria class of plants. It has its name from the celebrated Herman Boerhaave, phy-sician at Leyden. There are six species, all natives of the Indies. Some of these plants rise five or six feet high, but most of them only 18 inches or two feet. They carry flowers of a yellow or red colour, but are by no means so remarkable as to merit any particular description.

BOESCHOT, a town of the Austrian Netherlands, in the province of Brabant, seated on the river Nethe, in E. Long. 4. 45. N. Lat. 51. 5.

BOETHIUS, or BOETIUS, (Flavius Anicius Man-lius Torquatus Severinus), a prose as well as poetical

writer of the 6th century, born of one of the noblest families of the city of Rome. The time of his birth is related to have been about that period in the Roman history when Augustulus, whose fears had induced him to a resignation of the empire, was banished, and Odo-acer king of the Herulians began to reign in Italy, viz. in the year of Christ 476, or somewhat after. The fa-ther of Boetius dying while he was yet an infant, his relations undertook the care of his education and the direction of his studies. His excellent parts were soon discovered; and, as well to enrich his mind with the study of philosophy, as to perfect himself in the Greek language, he was sent to Athens. Returning young to Rome, he was soon distinguished for his learning and virtue, and promoted to the principal dignities in the state, and at length to the consulate. Living in great affluence and splendor, he addicted himself to the study of theology, mathematics, ethics, and logic; and how great a master he became in each of these branches of learning appears from those works of his now extant. The great offices which he bore in the state, and his consummate wisdom and inflexible integrity, procured him such a share in the public councils, as proved in the end his destruction; for as he employed his interest with the king for the protection and encouragement of de-serving men, so he exerted his utmost efforts in the de-tection of fraud, the repressing of violence, and the de-fence of the state against invaders. At this time Theo-doric the Goth had attempted to ravage Campania; and it was owing to the vigilance and resolution of Boetius that that country was preserved from destruc-tion. At length, having murdered Odoacer, Theodoric became king of Italy, where he governed 33 years with prudence and moderation, during which time Boetius possessed a large share of his esteem and confidence. It happened about this time that Justin, the emperor of the east, upon his succeeding to Anastasius, made an edict condemning all the Arians, except the Goths, to perpetual banishment from the eastern empire: in this edict Hormisdas bishop of Rome, and also the senate, con-curred. But Theodoric, who, as being a Goth, was an Arian, was extremely troubled at it; and conceived an aversion against the senate for the share they had borne in this proscription. Of this disposition in the king, three men of profligate lives and desperate fortunes, Gaudentius, Opilio, and Basiliscus, took advantage. Ha-ving entertained a secret desire of revenge against Boe-tius, for having been instrumental in the dismissal of the latter from a lucrative employment under the king, they accused him of several crimes; such as the stifling a charge, the end whereof was to involve the whole senate in the guilt of treason; and an attempt, by de-throning the king, to restore the liberty of Italy; and, lastly, they suggested, that, to acquire the honours he was in possession of, Boetius had had recourse to magi-cal arts.

Boetius was at this time at a great distance from Rome; however, Theodoric transmitted the complaint to the senate, enforcing it with a suggestion that the safety, as well of the people as the prince, was rendered very precarious by this supposed design to exterminate the Goths. The senate, perhaps fearing the resent-ment of the king, and having nothing to hope from the success of an enterprise which, supposing it ever to have been meditated, was now rendered abortive, with-

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out summoning him to his defence, condemned Boetius to death. The king, however, apprehending some bad consequence from the execution of a sentence so flagrantly unjust, mitigated it to banishment. The place of his exile was Ticinum, now the city of Pavia, in Italy: being in that place separated from his relations, who had not been permitted to follow him into his retirement, he endeavoured to derive from philosophy those comforts which that alone was capable of affording to one in his forlorn situation, sequestered from his friends, in the power of his enemies, and at the mercy of a capricious tyrant; and accordingly he there composed that valuable discourse, entitled *De Consolatione Philosophiæ*.

About two years after his banishment, Boetius was beheaded in prison by the command of Theodoric. His tomb is to be seen in the church of St Augustine, at Pavia, near the steps of the chancel.

The extensive learning and eloquence of this great man are conspicuous in his works, which seem to have been collected with great care: an edition of them was printed at Venice, in one volume folio, in 1499. In 1570, Glareanus, of Basil, collated that with several manuscripts, and published it, with a few various readings in the margin. His chief performance is that abovementioned *De Consolatione Philosophiæ*; a work well known in the learned world, and to which the afflicted have often applied. In particular, our Saxon king Alfred, whose reign, though happy upon the whole, was attended with great vicissitudes of fortune, had recourse to it at a time when his distresses compelled him to seek retirement; and, that he might the better impress upon his mind the noble sentiments inculcated in it, he made a complete translation of it into the Saxon language, which, within these few years, has been given to the world in its proper character. And Camden relates, that queen Elizabeth, during the time of her confinement by her sister Mary, to mitigate her grief, read and afterwards translated it into very elegant English. But it deserves also particular notice, that he is the most considerable of all the Latin writers on music; and that his treatise *De Musica* supplied for some centuries the want of those Greek manuscripts which were supposed to have been lost.

BOG properly signifies a quagmire, covered with grafs, but not solid enough to support the weight of the body; in which sense it differs only from marshes or fens, as a part from the whole: some even restrain the term *bog* to quagmires pent up between two hills; whereas fens lie in champaign and low countries, where the descent is very small—To drain boggy lands, a good method is, to make trenches of a sufficient depth to carry off the moisture; and if these are partly filled up with rough stones, and then covered with thorn-bushes and straw to keep the earth from filling up the interstices, a stratum of good earth and turf may be laid over all; the cavities among the stones will give passage to the water, and the turf will grow at top as if nothing had been done.

BOG, or *Bog of Gight*, a small town of Scotland, seated near the mouth of the river Spey, in W. Long. 2. 23. N. Lat. 57. 48.

BOG-*Spavin*. See FARRIERY, § xxxii. 3.

BOGARMITEÆ. See BOGOMILI.

BOGHO, or BUEIL, a town in the county of Nice

in Piedmont, situated on the frontiers of France, in E. Long. 6. 45. N. Lat. 44. 12.

BOGLIO, a district in the territories of the duke of Savoy, lying on the river Tinca on the frontiers of Provence; the capital is of the same name.

BOGLIO, a town of Piedmont, and county of Nice, being the capital of a territory of the same name. E. Long. 4. 50. N. Lat. 44. 12.

BOGOMILI, or BOGARMITEÆ, in church history, a sect of heretics, which sprung up about the year 1179. They held, that the use of churches, of the sacrament of the Lord's supper, and all prayer, except the Lord's prayer, ought to be abolished; that the baptism of Catholics is imperfect; that the Persons of the Trinity are unequal, and that they oftentimes made themselves visible to those of their sect. They said, that devils dwelt in the churches, and that Satan had resided in the temple of Solomon from the destruction of Jerusalem to their own time.

BOGOTO, the capital of New Granada in Terra Firma in South America, near which are gold mines. It is subject to Spain. W. Long. 73. 55. N. Lat. 4. 0.

BOHEA, in commerce, one of the best kinds of tea that come from China. There are three sorts of it: the first is bought at Canton for 80 tals *per picé*; the second for 45; and the third for 25. See THEA.

BOHEMIA, a kingdom of Europe, subject to the house of Austria, and surrounded on every side with woods and mountains as with a natural rampart. It is bounded on the east by Moravia and part of Silesia, on the north by Lusace and Upper Saxony, on the west by Franconia, and on the south by Bavaria. Altho' this kingdom is situated in the middle of Germany, and its king is an elector of the empire, it has nevertheless its particular assemblies, customs, and language, different from the Germans. It is one of the most elevated countries of Europe: for no river enters into it, though many have their source there; the chief of which are the Elbe, the Oder, the Vistula, and the Morava. The air is cold and unwholesome, for they have more epidemical diseases than in the neighbouring countries. There are mines of silver, copper, lead, and even some veins of gold. The capital city is Prague; the others are Cuttenburg, Konigengretz, Pilsen, Czaflaw, Budweys, Egra, Glatz, Tabor, and a great number of others: for they reckon more than 100 cities, among which almost 40 have the title of *Royal*. The name *Bohemia*, in the German language, signifies the *Home*, or *Abode*, of the *Boii*, a people of ancient Gaul, who under their leader Sergewellus settled in that country about 590 years before the Christian æra. These Boii were soon after expelled by the Marcomanni, a nation of the Suevi, who were afterwards subdued by the Scythians, a people of Scythia, whose language is still spoken in Bohemia and Moravia. Notwithstanding this expulsion of the Boii, the present inhabitants are still called *Bohemians* by foreigners, but the natives call themselves *Zechi*. At first they were governed by dukes; but the emperor Otho I. conquered the duke of Bohemia, and reduced the province under the empire. Afterwards Henry V. gave the title of *king* to Ladislaus duke of Bohemia; and since that time these kings have been electors and chief cup-bearers of the empire, and the kingdom has been elective; which privileges have been confirmed by the golden bull. Formerly

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Bohemia.

Formerly the kings of Bohemia received the kingdom as a fief of the empire, which ceremony was practised upon the frontiers; after which, the standards of the principalities of which it is composed were given to them, without being torn and given to the people, as is done with the ensigns of the other fiefs of the empire. Ferdinand I. of Austria, having married Anne, sister of Lewis, last king of Bohemia, who died without issue, and being elected king, that kingdom has remained in his family ever since. But the crown is conferred with some appearance of election; which right the states of Bohemia still pretend to claim, notwithstanding that, by the treaty of Westphalia, Bohemia is declared hereditary in the house of Austria.

The king of Bohemia is the first secular elector, and gives his opinion after the elector of Cologne; though he does not assist at the assembly of electors, except at the election of an emperor. For these 200 years past they have not appeared at the collegiate assemblies, nor even at the imperial diets. However, in 1708, the emperor caused one of his deputies, in quality of king of Bohemia, to enter into the college of electors at the diet of Ratibon, by the form of re-admission, together with the deputy of the elector of Brunswick. The states of Bohemia have never been comprehended in the government, or in the circles of the empire; they are not subject to any of its jurisdictions, nor to the Roman months, taxes, or public contributions; and they owe nothing to the empire but what the emperor Leopold voluntarily imposed upon himself, which amounts to 6000 livres a-year for the imperial chamber. The king pays homage to the emperor and the empire for his states as first secular elector; otherwise he has a right to exercise, through the whole extent of his dominions, all authority that the royalty can give, provided he do not violate the laws of the kingdom; according to which he cannot raise contributions or taxes but at the time when the states are assembled, the appointing of which is entirely in their own power. The government of Bohemia is different from that of all other states, the affairs of the kingdom being managed by six different courts. First, the council of the regency, or the great royal council, in which presides the great judge or burgrave of Bohemia, and who has under him 18 lieutenants of the king and other assessors. Secondly, the council, or superior chamber of justice, at which the great master of the kingdom is president. Thirdly, the chamber of fiefs. Fourthly, the new tribunal to judge the appeals of the German vassals in their differences on the account of fiefs; which court has also its president, vice-president, and assessors. Fifthly, the royal chamber of finances, which has a president and vice-president. Sixthly, the chancery, which always follows the court. Besides, every circle of Bohemia is governed by two bailiffs, who administer justice in their prefecture. The states are composed of the clergy, lords, nobles, and burghers. As to Moravia, there is a grand bailiff who governs it in the name of the king of Bohemia, as Margrave of Moravia. He is at the head of the royal council, which is composed of three assessors, and in which all is transacted in the name of the king. This province is divided into five circles, each of which has its bailiff. There are, besides, other officers of justice, who have a right of judging only at certain times, and in particular cases,

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where an appeal is allowed.

Bohemia was divided by the emperor Charles IV. into 12 provinces, in each of which he ordered two captains to be appointed every year for the administration of the government. The same emperor caused the church of Prague to be erected into an archbishopric, with this advantage, that the archbishop of Prague should have the prerogative that the archbishop of Mentz formerly enjoyed, viz. of crowning the king of Bohemia. The duchy of Silesia, the marquise of Moravia, and that of Luface, formerly held of this crown, but now only that of Moravia, which is incorporated with the kingdom of Bohemia, and is in the possession of the house of Austria.

The only remarkable occurrence in the Bohemian history is the rebellion of the disciples of John Hus, and Jerome of Prague, on account of their leaders having been burnt as heretics. This occasioned a bloody war of 16 years continuance; for a particular account of which, see the article HUSSITES.

BOHEMIAN BOLE. See BOLE.

BOHEMIAN BRETHREN, a sect of Christian reformers which sprung up in Bohemia in the year 1467. They treated the Pope and cardinals as antichrist, and the church of Rome as the whore spoken of in the Revelation. They rejected the sacraments of the Romish church, and chose laymen for their ministers. They held the Scriptures to be the only rule of faith, and rejected the Popish ceremonies in the celebration of the mass, nor did they make use of any other prayer than the Lord's Prayer. They consecrated leavened bread. They allowed no adoration but of Jesus Christ, in the communion. They re-baptized all such as joined themselves to their congregation. They abhorred the worship of saints and images, prayers for the dead, celibacy, vows, and fasts; and kept none of the festivals but Christmas, Easter, and Whitsuntide.

In 1504, they were accused by the Catholics to King Ladislaus II. who published an edict against them, forbidding them to hold any meetings either privately or publicly. When Luther declared himself against the church of Rome, the Bohemian brethren endeavoured to join his party. At first that reformer shewed a great aversion to them; but the Bohemians sending their deputies to him in 1523 with a full account of their doctrines, he acknowledged that they were a society of Christians whose doctrine came nearest to the purity of the gospel. This sect published another confession of faith in 1535, in which they renounced anabaptism, which they at first practised: upon which a union was concluded with the Lutherans, and afterwards with the Zuinglians, whose opinions from thenceforth they continued to follow.

BOHOL, one of the Philippine islands in Asia, lying to the northward of Mindanao, in E. Long. 122. 5. N. Lat. 10. o.

BOIANO, a town of Italy, in the kingdom of Naples, and county of Molese, with a bishop's see. It is seated at the foot of the Appennines, near the river Tilerio, in E. Long. 14. 38. N. Lat. 41. 30.

BOIARDO (MATTEO MARIA OF FERRARA), count of Scandiano, celebrated for his Italian poems, lived in the 15th century. His principal work is his *Orlando innamorato*. His Latin eclogues and sonnets are also much admired.

Bo. via

Boiardo.

Bojars
Boiling.
Boils.

BOJARS denote Russian noblemen. See RUSSIA.
BOIGUACU, in zoology, a synonyme of the boa coustrictor. See BOA.

BOII. See BOHEMIA.
BOIL, or FURUNCLE. See the *Index* subjoined to MEDICINE, and SURGERY.

BOILEAU SIEUR DESPREAUX (Nicholas), the celebrated French poet, was born at Paris in 1636. After he had gone through his course of polite literature and philosophy, his relations engaged him to the study of the law, and he was admitted advocate. But tho' he had all the talents necessary for the bar, yet he could not adapt himself to a science which turns upon continual equivocations, and often obliges those who follow it to clothe falsehood in the garb of truth. He therefore determined to study theology; but he could not long endure the thorns of school divinity. He imagined, that, to allure him more cunningly, chicanery, which he thought to avoid, had only changed her habit; and so he renounced the Sorbonne, betook himself entirely to the belles lettres, and took possession of one of the foremost places in Parnassus. The public gave his works the encomium they deserved; and Lewis XIV. who always loved to encourage the sciences and polite literature, was not only pleased to have Mr Boileau's works read to him constantly as he composed them, but settled a yearly pension of 2000 livres upon him, and gave him the privilege of printing all his works. He was afterwards chosen a member of the French academy, and also of the academy of medals and inscriptions. This great man, who was as remarkable for his integrity, his innocence, and diffusive benevolence, as for the keenness of his satires, died on the 2^d of March 1711, in the 75th year of his age. The best edition of his works is that published by Mr Brossette, with his notes and commentary.

BOILING, or EBULLITION, the bubbling up of any fluid. The term is most commonly applied to that bubbling which happens by the application of fire, though that which ensues on the mixture of an acid and alkali is sometimes also distinguished by the same name. Boiling, in general, is occasioned by the discharge of an elastic fluid through that which is said to boil; and the appearance is the same, whether it is common air, fixed air, or steam, that makes its way through the fluid. The boiling of water is proved by Dr Hamilton of Dublin, in his essay on the ascent of vapour, to be occasioned by the lowermost particles of the water being heated and rarified into vapour by reason of the vicinity of the bottom of the containing vessel; in consequence of which, being greatly inferior in specific gravity to the surrounding fluid, they ascend with great velocity, and, lacerating and pushing up the body of water in their ascent, give it the tumultuous motion called *boiling*. That this is occasioned by steam, and not by particles of air or fire, as some have imagined, may be very easily proved in the following manner: Let a common drinking glass be filled with hot water, and then inverted into a vessel of the same: as soon as the water in the vessel begins to boil, large bubbles will be observed to ascend in the glass, which will displace the water in it, and in a short time there will be a continual bubbling from under its edge; but if the glass is then drawn up, so that its mouth may only touch the water, and a cloth dipt in cold water be applied to the

outside, the steam within it will be instantly condensed, and the water will ascend so as to fill it entirely, or very nearly so. See the article EVAPORATION.

BOILING, in trade and manufactures, is a preparation given to divers sorts of bodies by making them pass over the fire, chiefly in water, tho' sometimes in other liquors. In this sense we speak of the boiling of salt, boiling of sugar, copperas, &c.

BOILING of *Silk with Soap* is the first preparation in order to dying it. Thread is also boiled in a strong lixivium of ashes to prepare it for dying.

BOILING, in the culinary art, is a method of dressing meats by coction in hot water, intended to soften them, and dispose them for easier digestion. The effects of boiling are different according to the kinds and quantities of the water. Pulse boiled in sea-water grow harder; mutton boiled in the same becomes softer and tenderer than in fresh water, but tastes saltish and bitter.

BOILING to *Death*, (*caldarii decoquere*), in the middle age; a kind of punishment inflicted on thieves, false coiners, and some other criminals.

BOILING, is also a method of trying or essaying the goodness or falshness of a colour or dye. The stuff is to be boiled in water with certain drugs, different according to the kind or quality of the colour, to try whether or no it will discharge, and give a tincture to the water. With this view crimson silks are boiled with alum, and scarlets with soap, in quantity equal to the weight of the silk.

BOILING-Well, in natural history. See BURNING-Springs.

BOINITZ, a town of Upper Hungary, in the county of Zell, remarkable for its baths and the quantity of saltpetre that grows about it. E. Long. 19. 10. N. Lat. 48. 42.

BOIOBI, in zoology, the name of a species of serpent found in America, and called by the Portuguese *cobra de verd*. It is about an ell in length, of the thickness of a man's thumb, and is all over of a very beautiful and shining green. Its mouth is very large, and its tongue black. It loves to be about houses, and never injures any creature unless provoked or hurt; but it will then bite, and its poison is very fatal. The natives take, as a remedy against its poison, the root *caaapia* bruised, and mixed with water. See *CAA Apia*.

BOQUIRA, the American name for the rattle-snake.

BOIS-LE-DUC, called by the Dutch *Hertogenbosch*, a large, strong, and handsome town of the Netherlands, in Dutch Brabant, seated between the rivers Dommel and Aa among morasses, in E. Long. 6. 16. N. Lat. 51. 45.

Bois de *Soignies*, the forest of Soignies, in the Austrian Netherlands and province of Brabant, about three miles south-east of Brussels.

Bois de *Coffi*, the name given to a South American tree growing about Surinam, held in the highest estimation by the Indians in that part of the world, and now recommended to the physicians in Europe by Dr Fermin in a treatise lately published at Amsterdam. The root is esteemed an excellent stomachic, restoring the appetite, and assisting digestion; but it is chiefly celebrated as an infallible remedy against even the most inveterate intermittents. It is said also to be used with great safety and advantage in every species of remit-

Boiling
Boils.

tent and continued fever, with patients of all ages, sexes, and conditions, even during pregnancy, and in the puerperal state. Before employing it, however, it is absolutely necessary to administer either a purgative or emetic. The best method of exhibiting it is in decoction: half an ounce of the bark of the root must be boiled in a close vessel with six pints of water till one half be consumed; the decoction is then strained off, and a cupful taken every two hours till the fever is entirely extinguished. Six or seven days after a cure is thus performed, it is generally necessary to repeat the purgative.

BOISSARD (John James), a famous antiquarian, born at Befançon the capital of Franche Compe in France. He published several collections which are of great use to such as are desirous to understand the Roman antiquities. He had a great passion for this study; and drew with his own hand plans of all the ancient monuments of Italy. He died at Metz, October 30th 1602. His principal works are, 1. Four volumes in folio of Roman antiquities, adorned with plates engraved by Theodore de Bey and his two sons. 2. *Theatrum vite humane*; which contains the lives of 193 famous persons, with their portraits. 3. A treatise de divinatione & magicis prestigiis. These works are scarce, and esteemed by the antiquarians.

BOIT, an excellent painter in enamel. He was born in Stockholm, and bred a jeweller: which profession he intended to follow in England; but changed his design, and went into the country, where he taught children to draw. He there engaged a gentleman's daughter, who was one of his scholars, to promise him marriage; but the affair being discovered, he was thrown into prison. In that confinement, which lasted two years, he studied enamelling; an art to which he fixed, on his return to London, and practised with the greatest success. The prices he is said to have obtained for his work are almost incredible: but being engaged in a very large design for the court, and Queen Anne dying before it was completed, he ran in debt, his goods were seized by execution, and he fled to France; where he changed his religion, was countenanced by the regent, and obtained a pension of 250*l.* per annum, but died suddenly at Paris in 1726. There is a large piece done by him at Kensington, representing Queen Anne sitting, and prince George standing by her; and at Bedford-house is another very large plate of the duke's father and mother.

BOITJAPO, in zoology, the name of a species of serpent found in America; and called by the Portuguese there, *cobra di apo*. It grows to seven or eight feet long, is about the thickness of a man's arm, and very small and taper towards the tail. Its back is of an olive colour; its belly yellow, and covered with very regular and elegant triangular scales. It feeds on frogs, &c. but is very poisonous, and its bite extremely fatal.

BOKHARA, a city of Tartary in Asia, and capital of Great Bukharia, situated one day's journey to the north of the river Jehun, or Amu; in E. Long. 65. 50. N. Lat. 39. 15. In 1219 it was besieged by Jenghiz Khan, as being part of Sultan Mohammed's dominions, a descendant of the famous Mahmud Gazari. At that time, besides the city-walls, which were very strong, Bokhara had an outward inclosure 12 leagues

in compals; which shut in not only the suburbs, but also many pleasant seats and farms watered by the river Soghd, from whence the ancient Sogdiana took its name. The Mogul army arrived before the place in July, and continued the siege during the following winter. In March 1220, they forced the outer wall, and began to besiege the city in form. Sultan Mohammed had left in the city a very numerous garrison under the command of three generals, who made a sally at the head of 20,000 men: but being repulsed with great loss, their courage failed them; and, instead of slaying to defend the inhabitants, as soon as they had got into the city by one gate, passed out by another with their families, and almost all their soldiers, hoping to escape by the darkness of the night: but their design being discovered, they were pursued by a detachment of 30,000 Moguls; and being overtaken at the river Amu, they were, after a bloody dispute, almost all cut to pieces. Mean time, Jenghiz Khan, being informed of the confusion into which the city had been thrown by the desertion of the garrison, ordered an attack to be made on all sides at once; but while he was preparing for this, the magistrates and clergy went out and presented him with the keys of the city. Jenghiz Khan granted them their lives, on condition that they gave no shelter to any of the sultan's soldiers, and put out all who should be suspected of being in that prince's interest; which they promised to do upon oath. All the young people, however, who were displeased with the surrender, retired with the governor to the castle, which was very strong, and resolved to defend themselves to the last extremity. Jenghiz Khan, having taken possession of Bokhara, entered on horseback into the great mosque, and asked merrily if that was the sultan's palace? On being answered that it was the house of God, he alighted; and giving the principal magistrate his horse to hold, mounted the gallery where the ecclesiastics usually sat, and then taking up the Koran, threw it under the feet of his horses. Having staid here for some time, he retired to his camp; where, some days after, having assembled the principal people of Bokhara, and ascended a pulpit erected for that purpose in the midst of them, he began his speech by praising God, and recounting all the favours he had received from the Almighty: he then mentioned the perfidious behaviour of their sultan towards himself, telling them that God had sent him to rid the world of such wicked men. As to them, he testified his satisfaction for their having freely furnished his army with necessaries; and promised that his soldiers should not meddle with any goods which they made use of in their houses; but commanded them to deliver up what they had hidden, under pain of being tortured. This speech had such an effect, that the poor inhabitants delivered up every thing, as well what they had concealed, as what they had pretense use for; notwithstanding which, the tyrant soon after caused the city to be burnt, on pretence that some of the sultan's soldiers were concealed in it. As all the houses were made of wood, except the sultan's palace which was built of stone, and some few private houses of brick, the whole was utterly consumed; and Jenghiz Khan having found some few soldiers that had actually concealed themselves, put them all to death without mercy. The castle surrendered at discretion soon after; and

Bokharia
Boles.

though it was demolished, the governor and garrison, out of a very extraordinary piece of clemency from so bloody a tyrant, had their lives spared. Bokhara continued in ruins for some years, but at length Jenghiz Khan ordered it to be rebuilt. It is now large and populous; and is the residence of a khan who is altogether despotic, though his power reaches but a little way without the city. The town is seated on a rising ground, with a slender wall of earth and a dry ditch. The houses are low, built mostly of mud; but the caravanas and mosques, which are numerous, are all of brick. The bazars or market-places, which have been lately buildings, are now mostly in ruins. The inhabitants are more civilized and polite than some of their neighbours; and yet are cowardly, cruel, effeminate, and very perfidious. Great numbers of Jews and Arabians frequent this place, though they are much oppressed, and frequently deprived of all their properties by the khan or his attendants at pleasure. At best they pay heavy taxes, and it is almost criminal to be rich.

BOKHARIA. See **BUKHARIA.**

BOLANDUS (John), a famous Jesuit, born at Tillemont in the Netherlands, in 1596. He distinguished himself by writing the lives of the saints, under the title of *Acta Sanctorum*, of which he published five volumes in folio; but died while he was labouring at the sixth, in the 70th year of his age. The continuators of that work are called *Bollandists*.

BOLBITINUM, (anc. geog.), the second mouth of the Nile reckoning from west to east; now very small, choked up with sand, and called *le Bras de Belin*.

BOLENTIUM, (anc. geog.), a town of Pannonia Superior; now *Rachenburg* in Stiria *.

* See *Rachenburg*.

BOLES, are viscid earths, less coherent and more friable than clay; more readily uniting with water, and more freely subsiding from it. They are soft and unctuous to the touch; adhere to the tongue; and by degrees melt in the mouth, impressing a light sense of alacrity. There are a great variety of these earths, the principal of which are the following.

1. Armenian bole, when pure, is of a bright red colour with a tinge of yellow: It is one of the hardest and most compact bodies of this class, and not smooth and glossy like the others, but generally of a rough and dusty surface. It does not effervesce with acids, though some part of it is dissolved by all of them. Neumann observes, that four ounces of Armenian bole distilled in a glass retort in an open fire, yielded three drachms of a saline phlegm, which smelt a little urinous, and changed syrup of violets green. In the neck of the retort was found a little powdery saline matter which had an ammoniacal taste, but it was in too small quantity to be collected or further examined. Like most other coloured earths, this kind of bole contains a portion of ferruginous matter, to which the colour is owing; and which may be separated by the magnet, after the bole has been calcined with oil or other inflammable matters. It is likewise impregnated with vitriolic acid; and hence, when mixed with nitre or sea-salt, it extricates the acids of these salts in the fire.

2. French bole is of a pale red colour, variegated with irregular specks of white and yellow. It is much softer than the Armenian, and slightly effervesces with

acids.

3. Bole of Blois is yellow, remarkably lighter than most of the other yellow earths, and effervesces strongly with acids.

4. Bohemian bole is of a yellow colour, with a cast of red, and generally of a flaky texture. It is not acted on by acids.

5. Lemnian earth is of a pale red colour, and slightly effervesces with acids.

6. Silebian bole is of a pale yellow colour, and acids have no sensible effect upon it.

These and other earths, made into little masses, and stamped with certain impressions, are called *terra sigillata*. They have been recommended as astringent, sudorific, and alexipharmic; but these and many other virtues that have been ascribed to them appear to have no foundation. They are still, however, prescribed in fluxes and complaints of the primæ viæ.

BOESLAFF, or **BUNTZLAU**, a town of Silesia seated on the river Bobar, in E. Long. 16. 0. N. Lat. 51. 12.

BOESLAUS I. and **II.** kings of Poland *.

* See *Pa-laud*.

BOLETUS, **SPUNK**, a genus of the order of fungi, belonging to the cryptogamia class of plants; of which botanists enumerate 17 species. The following are the most remarkable. 1. The suberosus, or white cork spunk, grows commonly on the trunks of birch and willow trees in England and Scotland. It grows sessile and horizontal; its figure is semicircular; the upper side convex, the under nearly plain; of various sizes, from that of an ass's hoof, to a peck-measure. The upper surface is quite white, generally covered with a short strong down, but sometimes smooth. The flesh or internal substance is thick, white, tough, light, and spongy, like cork; and is sometimes cut and shaped by the country people, and used as corks in their bottles: but such corks must not be suffered to touch the liquid, for moisture soon renders them soft and useless.

2. The igniarius, or touchwood-spunk, is frequent on the trunks of old trees of all kinds, especially ash. It consists of a very hard woody substance, in shape like a horse's hoof, and grows of various sizes, from a man's fist to that of his head and larger. The upper side is smooth, but uneven, distinguished near the rim by elevated zones of different colours, brown, grey, tawny, &c. The flesh is of a tawny brown colour, extremely hard and tough. This fungus is made use of in Germany and some parts of England for tinder. The Germans boil it in strong lye, dry it and boil it again in solution of saltpetre. The Laplanders burn it about their habitations, in order to keep off a species of the gadfly which is fatal to the young reindeer. It has been used to stop the bleeding of the vessels after amputations. For this purpose the hard outer part is cut off, and the soft inner substance is beat with a hammer to make it still softer. It is best when gathered in August or September.

3. The bovinus, or cow-spunk, is frequent in woods and pastures. It is generally of a brown colour, though sometimes it is tawny, yellowish brown, reddish brown, deep red, purple, or greenish brown. The flesh is yellow, white, or reddish. The young plants are eaten in Italy, and esteemed a great delicacy. The Germans also account them a dainty, calling them *gombas*, and *brat-bulz*. Cows, deer, sheep, and swine, will feed upon this and other boleti, and are sometimes greatly

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XLVIII.
p. 2. and
XLIX. p. 1.

Boleslaff
Bolesus.

Boleyn,
Bolingbroke

greatly disordered by them. In cows and other cattle they have been known to create bloody urine, nauseous milk, swellings of the abdomen, inflammations of the bowels, stoppages, diarrhæas, and death. In sheep they bring on a scirrhus liver, a cough, a general wasting, and dropsy. *Scarabs, dermeſtes*, and many other insects, feed upon and breed in them in abundance.

BOLÉYN (Ann), queen of Henry VIII. of England; memorable in the English history, as the first cause of the reformation, as the mother of queen Elizabeth under whom it was completely established, and also on account of her own sufferings. She was born in 1507, and beheaded in 1536 †.

BOLINGBROKE, or BULLINGBROKE, a town of Lincolnshire in England. It hath the title of an earldom, and is a very ancient place, but is now in a mean condition. E. Long. o. 40. N. Lat. 53. 15.

BOLINGBROKE (Henry St John), lord viscount, a great statesman and philosopher, descended from an ancient and noble family, was born about the year 1672. He had a regular and liberal education; and, by the time he left the university, was considered as a person of uncommon qualifications: but, with great parts, he had, as it usually happens, great passions, and these hurried him into many indiscretions and follies. Contrary to the inclinations of his family, he cultivated Tory connections; and gained such an influence in the House of Commons, that in 1704 he was appointed secretary of war and of the marines. He was closely united in all political measures with Mr Harley: when, therefore, that gentleman was removed from the seals in 1707, Mr St John resigned his employment; and in 1710, when Mr Harley was made chancellor of the exchequer, the post of secretary of state was given to Mr St John. In 1712 he was created Baron St John of Lediard-Tregoe in Wiltshire, and Viscount Bolingbroke. But being overlooked in the bestowal of vacant ribbons of the order of the garter, he resented the affront, renounced the friendship of Harley then earl of Oxford, and made his court to the whigs. Nevertheless, on the accession of George I. the seals were taken from him; and being informed that a resolution was taken to pursue him to the scaffold, for his conduct regarding the treaty of Utrecht, he withdrew to France. Here he accepted an invitation to enter into the Pretender's service, and accepted the seals as his secretary: but he was as unfortunate in his new connections as in those he had renounced; for the year 1715 was scarcely expired, when, at the same time that he was attainted of high treason at home, the seals and papers of his foreign secretary's office were taken from him; followed by an accusation from the Pretender and his party, of neglect, incapacity, and treachery. Such a complication of distressful events threw him into a state of reflection, that produced by way of relief a *consolatio philosophica*, which he wrote the same year under the title of *Reflections upon exile*; and the following year drew up a vindication of his conduct with respect to the Tories, in the form of *A Letter to Sir William Wyndham*. His first lady being dead, he about this time espoused a niece of the famous Madam Maintenon, and widow of the marquis de Villette, with whom he had a very large fortune. In 1723 the king was prevailed on to grant him a free pardon, and he returned in consequence to England; but was

by no means satisfied within, while he was yet no more than a mere titular lord, and remained excluded from the house of peers. This stigma operated to fix him in enmity to Sir Robert Walpole, to whose secret enmity he attributed his not receiving the full extent of the king's clemency: hence he distinguished himself by a multitude of political writings, till the year 1735; when, being thoroughly convinced that the door was finally shut against him, he returned once more to France. In this foreign retreat he began his course of Letters on the study and use of History, for the use of Lord Combury, to whom they are addressed. Upon the death of his father, who lived to be extremely old, he settled at Battersea, the ancient seat of his family, where he passed the remainder of his life in philosophical dignity. Pope and Swift, one the greatest poet, the other the greatest wit, of the time, perfectly adored him; and it is well known that the former received from him the materials for his incomparable poem the "Essay on Man."—He died in 1751, and left the care and benefit of his MSS. to Mr Mallet, who published them together with his former printed works, in 5 vols 4to: they are also printed in 8vo.

BOLISAW, a town of the kingdom of Bohemia in Germany, situated in E. Long. 14. 35. N. Lat. 50. 25. BOLKOWITZ, a town of Silesia, in the duchy of Glogaw. E. Long. 15. 20. N. Lat. 51. 27.

BOLLARDS, large posts set into the ground on each side of a dock. On docking or undocking ships, large blocks are lashed to them; and through these blocks are reeved the transporting hawsers to be brought to the capstons.

BOLLITO, a name by which the Italians call a sea-green colour in artificial crystal. To prepare this colour, you must have in the furnace a pot filled with 40 lb. of good crystal, first carefully skimmed, boiled, and purified, without any manganese: then you must have twelve ounces of the powder of small leaves of copper thrice calcined, and half an ounce of saffre in powder: mix them together; and put them at four times into the pot, that they may the better mix with the glass; stirring them well each time of putting in the powder, lest the mixture should swell and run over.

BOLOGNA, an ancient, large, and very handsome town of Italy, in the territory of the church, and capital of the Bolognese; an archbishop's see, and an university. The public buildings are magnificent, as well with regard to the architecture, as the ornaments, especially the paintings, which are done by the greatest masters. There are a vast number of palaces, in one of which the pope's nuncio resides; the private houses are also well built. Here are 169 churches, and the town is said to contain about 80,000 inhabitants. All the gates and windows are open during the summer; inasmuch that one may see into their apartments and gardens, where there are vast numbers of orange-trees that perfume the air. It is a place of great trade, which is in some measure owing to a canal that runs from this city to the river Po. The Reno, which runs near Bologna, turns 400 mills that are employed in the silk-works; besides, they deal in wax, soap, hams, saffages, and even lap-dogs, which are greatly esteemed. It is seated at the foot of the Apennine mountains, in E. Long. 11. 30. N. Lat. 44. 27.

BOLOGNE, by the English commonly called *Bul-lens*,

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Bologne.See (hi-
story of)
England.

Bolognese
Bolt.

Bolt
Bolton.

len, a city of Picardy in France, and capital of the Bolonnois, seated near the sea. It is divided into two towns, the Upper and Lower; the first is strongly fortified, the other is inclosed by walls only. The port is at the mouth of the river Liane, but the water is so shallow that no ships of burden can enter it. It is defended on the side of the river by a mole, which shelters it from the winds, and at the same time prevents the river from filling it with filth. E. Long. 9. 17. N. Lat. 50. 42.

BOLOGNESE, a small province of Italy, in the territory of the church, bounded on the north by the Ferrarese, on the west by the duchy of Modena, on the south by Tuscany, and on the east by Romania. It is watered by a great number of small rivers, which render its soil the most fertile of any in Italy. Bologna is the capital, and from the great produce of the land about it is called *Bologna the fat*. It produces abundance of all sorts of grain and fruits; particularly muscadine grapes, which are in high esteem. Here are mines of alum and iron; and the inhabitants fabricate large quantities of linen, silk stockings, and cloth.

BOLOGNIAN STONE. See **CHEMISTRY**, n° 339.

BOLSANE, a town of Germany, in the territory of Tyrol, and circle of Austria. It is very agreeably situated in the midst of a fine large valley, full of villages, and abounding in vineyards. The vines in this valley are the best in all Tyrol; but they must be drank the year after that of their growth, otherwise they become unfit for use. E. Long. 11. 17. N. Lat. 46. 42.

BOLSENNA, a town of Italy, in the territories of the pope, seated on a lake of the same name. E. Long. 11. 3. N. Lat. 42. 37.

BOLSTER, among surgeons, a soft yielding substance, either laid under the head, or a broken limb. In this sense, bolsters are contrived for crooked, bunched, and otherwise distorted backs, shoulders, &c.

By a constitution made under archbishop Burchier, the clergy are forbidden to wear bolsters about their shoulders, in their gowns, coats, or doublets. The occasion of the prohibition is variously construed. Some say that bolsters came in fashion in the reign of king Richard III. who being necessitated by his natural deformity, to pad, the courtiers, and even the clergy, did the same, out of complaisance to their prince; so that every body who had the misfortune to be born straight, was obliged to wear a bolster on his shoulders to be in the fashion. Others, however, controvert this; alleging that the constitution above mentioned was made 20 years before the usurpation of Richard.

BOLSTERS of a Saddle, those parts of a great saddle which are raised upon the bows, both before and behind, to hold the rider's thigh, and keep him in a right posture.

BOLSWAERT, a town of the United Provinces, in West Friesland, and in the county of Westergoe. E. Long. 5. 35. N. Lat. 53. 6.

BOLT, among builders, an iron-fastening fixed to doors and windows. They are generally distinguished into three kinds, *viz.* plate, round, and spring bolts.

BOLTS, in gunnery, are of several sorts; as, 1. Transum bolts, that go between the cheeks of a gun carriage, to strengthen the transums. 2. Prife bolts; the large knobs of iron on the cheeks of a carriage, which keep the hand-spike from sliding, when it is poizing up

the breech of a piece. 3. Traverse bolts; the two short bolts, that, being put one in each end of a mortar carriage, serve to traverse her. 4. Bracket-bolts; the bolts that go through the cheeks of a mortar, and by the help of quoins keep her fixed at the given elevation. And, 5. Bed-bolts; the four bolts that fasten the brackets of a mortar to the bed.

BOLTS, in a ship, are iron pins, of which there are several sorts, according to their different makes and uses. Such are drive-bolts, used to drive out others. Ray-bolts, with jags or barbs on each side, to keep them from flying out of their holes. Clench-bolts, which are clenched with rivetting hammers. Forelock-bolts, which have at the end a forelock of iron driven in to keep them from starting back. Set-bolts, used for forcing the planks, and bringing them close together. Tend or fender bolts, made with long and thick heads, and struck into the uttermost bends of the ship, to save her sides from bruises. And ring-bolts, used for bringing to of the planks, and those parts whereto are fastened the breeches and tackle of the guns.

BOLT of Canvas, in commerce, the quantity of 28 ells.

BOLT-Rope, in naval affairs, a rope passing round the sail, to which the edges of it are sewed, to prevent the sail from tearing: the bottom part of it is called the *foot-rope*; the sides, *leeches*; and if the sail be oblong or square, the upper part is called the *head-rope*.

BOLTED FLOUR, that which has passed thro' the bolters. See the following article.

BOLTERS, or **BOULTERS**, a kind of sieves for meal, having the bottoms made of woollen, hair, or even wire. The bakers use bolters which are worked by the hand; millers have a larger sort, wrought by the motion of the mill.

BOLTING, a term of art used in our inns of court, whereby is intended a private arguing of cases. The manner of it at Gray's inn is thus: An ancient and two barristers sit as judges; three students bring each a case, out of which the judges choose one to be argued; which done, the students first argue it, and after them the barristers. It is inferior to *mooting*; and may be derived from the Saxon word *bolt*, a house, because done privately in the house for instruction. In Lincoln's inn, Mondays and Wednesdays are the bolting days in vacation time; and Tuesdays and Thursdays the moot days.

BOLTING, or *Boulting*, the act of separating the flour from the bran, by means of a sieve or bolter *.

BOLTING-Cloth, or *Bolster-cloth*, sometimes also called *bulting-cloth*, denotes a linen or hair cloth for sifting meal or flour.

BOLTING Mill, a versatile engine for sifting with more ease and expedition. The cloth round this is called the *bolter*.

BOLTING, or *Boulting*, among sportsmen, signifies rousing or dislodging a coney from its resting place. The say, to *bolt* a coney, *start* a hare, *rouse* a buck, &c.

BOLTON or **BOULTON** (Edmund), an ingenious English antiquarian, who lived in the beginning of the 17th century. His most considerable work is that intitled *Nero Caesar*, or *Monarchie depraved*, dedicated to the duke of Buckingham, lord-admiral, printed at London 1624, folio, and adorned with several curious and

* See *Bolter*.

Bolton
Bomb.

valuable medals. It is divided into 55 chapters, in some of which are introduced curious remarks and observations. In the 24th and 25th chapters he gives an account of the revolt in Britain, against the Romans, under the conduct of Boadicea, which he introduces with a recapitulation of the affairs in Britain from the first entrance of the Romans into this island under Julius Cæsar, till the revolt in the reign of Nero. In chapter 36th he treats of the East-India trade in Nero's time, which was then carried on by the river Nile, and from thence by caravans over land to the Red-Sea, and thence to the Indian ocean; the ready coin carried yearly from Rome upon this account, amounting, according to Pliny's computation, to above 300,000 pounds sterling; and the usual returns in December and January, yielding, in clear gain, an hundred for one. Besides this he wrote, 1. An English translation of Lucius Florus's Roman history. 2. Hypercritica, or a rule of judgment for reading or writing our histories. 3. The elements of armories, &c.; and some other works.

BOLTON, a town of Lancashire in England, seated on the river Croell, and pretty well built. It has a manufacture for fustians, and the market is considerable for cloth and provisions. W. Long. 2. 15. N. Lat. 53. 55.

BOLUS, an extemporaneous form of a medicine, soft, coherent, a little thicker than honey, and the quantity of which is a little morrel or mouthful; for which reason it is by some called *buccella* *.

BOMAL, a town of Luxemburg in the Austrian Netherlands, situated on the river Ourt, in E. Long. 5. 30. N. Lat. 50. 20.

BOMB, in military affairs, a large shell of cast iron, having a great vent to receive the fusee, which is made of wood. The shell being filled with gunpowder, the fusee is driven into the vent or aperture, within an inch of the head, and fastened with a cement made of quicklime, ashes, brick-dust, and steel-filings, worked together in a glutinous water; or of four parts of pitch, two of colophony, one of turpentine, and one of wax. This tube is filled with a combustible matter, made of two ounces of nitre, one of sulphur, and three of gunpowder-dust, well rammed. To preserve the fusee, they pitch it over, but unsafe it when they put the bomb into the mortar, and cover it with gunpowder dust; which having taken fire by the flash of the powder in the chamber of the mortar, burns all the time the bomb is in the air; and the composition in the fusee being spent, it fires the powder in the bomb, which bursts with great force, blowing up whatever is about it. The great height a bomb goes in the air, and the force with which it falls, makes it go deep into the earth.

Bombs may be used without mortar-pieces, as was done by the Venetians at Candia, when the Turks had possessed themselves of the ditch, rolling down bombs upon them along a plank set sloping towards their works with ledges on the sides, to keep the bomb right forward. They are sometimes also buried under ground to blow up *.—Bombs came not into common use before the year 1634, and then only in the Dutch and Spanish armies. One Malthus an English engineer is said to have first carried them into France, where they were put in use at the siege of Colliouf. The French

have lately invented a new sort of bombs of vast weight called *comminges*.—The art of throwing bombs makes a branch of gunnery, founded on the theory of projectiles, and the laws and qualities of gunpowder *.

BOMBARD, a piece of ordnance anciently in use, exceedingly short and thick, and with a very large mouth. There have been bombards which have thrown a ball of 300 pound weight. They made use of cranes to load them. The bombard is by some called *basilisk*, and by the Dutch *donderbus*.

BOMBARDIER, a person employed about a mortar. His business is to drive the fusee, fix the shell, and load and fire the mortar.

BOMBARDIER, in zoology. See CARABUS.

BOMBARDMENT, the havoc committed in throwing bombs into a town or fortrefs.

BOMBARDO, a musical instrument of the wind kind, much the same as the bassoon, and used as a base to the hautboy.

BOMBASINE, a name given to two sorts of stuffs, the one of silk, and the other crossed of cotton.

BOMBAST, in composition, is a serious endeavour, by strained description, to raise a low or familiar subject beyond its rank; which, instead of being sublime, never fails to be ridiculous. The mind in some animating passions is indeed apt to magnify its objects beyond natural bounds: but such hyperbolic description has its limits; and, when carried beyond these, it degenerates into burlesque, as in the following example.

Sejanns. ————— Great and high,

The world knows only two, that's Rome and I.

My roof receives me not; 'tis air I tread,

And at each step I feel my advance'd head

Knock out a star in heaven. SEJAN. of Ben. Johnson, act 5.

A writer who has no natural elevation of genius is extremely apt to deviate into bombast. He strains above his genius, and the violent effort he makes carries him generally beyond the bounds of propriety.

BOMBAX, or SILK-COTTON TREE; a genus of the polyandria order, belonging to the monodelphia class of plants.

Species. 1. The ceiba, with a prickly stalk. 2. The pentadrum, with a smooth stalk. 3. The hentsaphyllum, with leaves cut into seven parts. The first and second sorts grow naturally in both the Indies, where they arrive at a great magnitude, being some of the largest trees in these parts; inasmuch that Bosman says he has seen in Guinea, trees of this kind so widely diffused that 20,000 armed men might stand under the branches of one. They generally grow with very straight stems. Those of the first sort are armed with short strong spines: but the second hath very smooth stems, which in the young plant are of a bright green; but after a few years they are covered with a grey or ash-coloured bark, which turns brown as the trees grow older. The branches toward the top are garnished with leaves composed of five, seven, or nine oblong smooth little leaves, which are spear-shaped, and join to one common centre at their base, where they adhere to the long footstalk. The flower-buds appear at the end of the branches; and soon after the flowers expand, which are composed of five oblong purple petals, with a great number of stamina in the centre: when these fall off, they are succeeded by oval fruit as

Bombard
Bombax.

* See
Bosman
&c.

large.

See Phar-
macy,
p. 869.

See Caif-
in.

Bombax,
Bombay.

large as a swan's egg, having a thick ligneous cover, which when ripe opens in five parts, and is full of a dark short cotton, inclosing many roundish seeds as large as small pease. The cotton of the third sort is of a fine purple colour, but the size of the tree is not particularly mentioned by botanical writers. Besides these species, Mr Miller mentions another which he saw in the gardens of the late duke of Richmond at Goodwood, and was raised from seeds which came from the East Indies. The stem was very straight and smooth, the leaves were produced round the top upon very long footstalks, each being composed of seven or nine narrow silky small lobes, joined at their base to the footstalk in the same manner as the first and second; but they were much longer and reflected backward, so that at first sight it appeared very different from either of them.

Culture. These plants, being natives of warm climates, must always be kept in a stove. They are raised from seeds procured in the capsules from the places where they grow naturally. These are to be sown in the spring, in pots of light earth, plunged in a substantial hot-bed of dung or tan, where the plants will appear in three or four weeks. They must then be placed separately in small pots, plunging them in the bark-bed, giving them shade and water, and shifting them occasionally into larger pots with fresh earth. They must be watered plentifully in summer, but moderately in winter.

Uses. The dark short cotton of the first two species is used by the poorer inhabitants of those places where such trees grow to stuff pillows or chairs, but is generally deemed unwholesome to lie upon. The beautiful purple down of the third is spun, wrought into clothes, and wore, without being dyed any other colour, by the inhabitants of the Spanish West Indies, where the tree naturally grows. Large pirogues, or canoes fit to carry a sail, are made both at Senegal, and in America, of the trunk of the silk-cotton tree, the wood of which is very light, and found unfit for any other purpose. In Columbus's first voyage, says Miller, it was reported, that a canoe was seen at Cuba made of the hollowed trunk of one of these trees, which was 95 palms long, of a proportional width, and capable of containing 150 men.

BOMBAX, in zoology, a synonyme of a species of cornus†.—*Bombax* is also used sometimes for silk or cotton; but the true botanic name of cotton is *Gossypium*. It is likewise applied by Linnaeus to signify such insects as have incumbent wings, and feelers resembling a comb.

BOMBAY, an island of Asia, in the East Indies, on the west coast of the peninsula on this side the Ganges. It is about seven miles in length, and 20 in circumference, and is situated in E. Long. 73.0. N. Lat. 19.0. The principal town is near a mile long; but the houses are mean, low, and paltry, a few only excepted which belong to the Portuguese. The soil is barren, and incapable of any improvement, nor has the island any good water on it. The best is what they preserve in their cisterns after the rains, that which is afforded by the wells having a brackish disagreeable taste. The estates on the island are chiefly laid out in groves of fine cocoa-trees. Their gardens also produce mangoes, jacks, and other Indian fruits. They make salt in large quantities by letting the sea into pits, where the sun

evaporates the water, leaving the salt behind. The air and climate are rather unhealthy, although the natives, and persons accustomed to the country, live to a good old age. Most people on their arrival are seized with fevers, fluxes, scrophulous disorders, or a disease they call the *barbier*, which wholly enervates the body, reducing it to a total state of inactivity, and deprivation of all its loco-motive faculties. After rains a multitude of venomous creatures appear, which grow to an extraordinary size. Their spiders are as large as a walnut, and their toads almost equal a duck in magnitude. The inhabitants are a mixture of several nations, English, Portuguese, and Indians, amounting in all to 50,000 or 60,000. Formerly the president of Bombay appeared with all the pomp of a crowned head; being attended when he went abroad by troops of Moors and Bandarins, colours flying, drums beating, and music playing; but after the presidency was removed to Surat, this splendor greatly diminished.

Bombay formerly belonged to the Portuguese: but on the setting on foot a treaty of marriage between Charles II. and the infanta of Lisbon, it was thought a proper opportunity for procuring the cession of some convenient port and mart for the India company, as part of the infanta's portion; and thus the island of Bombay came into the hands of the English, with whom it has ever since continued. After the king's marriage, a squadron, conducted by lord Marleburgh, was sent to receive the possession and investiture of the island from the viceroy, who had received his Portuguese majesty's commands to that effect. But on lord Marleburgh's arrival in September 1633, with a squadron of five men of war, the clergy made such violent opposition, and so positively refused to yield the island to heretics, that the viceroy was terrified, and determined to keep possession of the island. The governor of Surat, under whose jurisdiction Bombay then was, threatened the English factory at Surat, in case the English troops did not reembark from that place, to which lord Marleburgh had been obliged to retire on account of the viceroy's obstinate refusal. His lordship therefore set sail in January 1664, with two ships for England; leaving the rest under the command of Sir Abraham Shipman, to spend the remainder of the western monsoons in some of the neighbouring ports. During his stay he buried above 200 of his men on a desolate island called *Anjadiva*, where he had wintered. The monsoons being over, Sir Abraham threatened the viceroy and clergy who opposed his pretensions with the vengeance of the kings of England and Portugal if they continued longer obstinate, or denied obedience to their majesties instructions and contracts. At last the terrors of a British fleet got the better of religion; the church began to abate of her zeal, and consented to a treaty, by which the inhabitants were to be continued in the free exercise of their religion and possession of their estates under the crown of England. Sir Abraham dying, Mr Cook, next in commission, signed the treaty; and, in quality of governor, took possession of the island in the name of the king his master. Here he immediately set about building a fortress; but a capital mistake he made in concluding the treaty, by not including the appendages to Bombay, extending to Verica on Salet, has been a bone of contention ever since. The fort was laid out in a regular manner, and

Bombay

† See Cornus.

Bombay an old square house fitted out for himself as governor; but Mr Hamilton observes, that both Mr Cook, and some of his successors, never once thought of a church.

Thus the trade of Bombay flourished exceedingly; but the revenues of the place not being equal to the expence of keeping it, and other political and commercial reasons superadded, the crown was obliged to make it over in fee-tail to the East India Company, who still continue to hold it in that manner. After the fort was traced and the foundation laid, Sir George Lucas arrived from England with two ships; but affairs being accommodated before he came, he continued here no longer than January 1666, when he returned to England, leaving the government as he found it, in the hands of Mr Cook and the council, under the presidency of the settlement at Surat. Mr Cook shewed his ignorance of architecture, by building the fort upon the ground on which it stands, and which is exceedingly inconvenient. As an engineer, too, he committed a capital error; his fort being commanded by a hill called *Dangerree*, about 800 paces distance. The consequences of this unfortunate choice were apparent in the year 1689, when it was besieged by the Mogul. In this he is the more inexcusable, as common sense, though joined with the greatest ignorance of architecture and engineering, might have pointed out a much more commodious situation about 500 paces to the southward. As for the magnitude, figure, and materials of the fort, says captain Hamilton, there is nothing considerably faulty. It is a regular tetragon, whose outside polygon is about 500 paces, built of an excellent hard stone. It can mount 100 pieces of cannon; and these particulars are all that can be alleged in its favour. It has not a single spring of fresh water; which very circumstance must, in case of a siege, render all its fortifications of little or no value, since a little patience must render the enemy masters of it at discretion.—For the further particulars of the history of Bombay, see the article *EAST INDIES*.

BOMB-KETCH, a small vessel built and strengthened with large beams for the use of mortars at sea.

BOMBUS, in medicine, a refunding and ringing noise in the ears. It is a bad sign in acute diseases.

BOMBYLIUS, in zoology, a genus of insects belonging to the order of diptera. The rostrum is long, bristly, and bivalved; the bristles being fixed between the horizontal valves. There are five species, viz. 1. The major, with black wings. 2. The medius, with a yellowish body, white behind, and the wings spotted with yellow. 3. The minor, with unspotted wings. 4. The ater, has red wings, but a little blackish at the base; and green feet. The above four are natives of Europe. 5. The capensis, with the wings spotted with black, an ash-coloured body, and white behind. It is a native of the Cape of Good Hope.

BOMENE, a sea-port town of the United Provinces, in Zealand, seated on the northern shore of the island of Schonen, opposite to the island of Goree, in E. Long. 4. 0. N. Lat. 51. 50.

BOMMEL, a town of Dutch Guelderland, situated on the northern shore of the river Waal, in E. Long. 5. 50. N. Lat. 52. 0.

BOMONICI, in Grecian antiquity, young men of Lacedæmon, who contended at the sacrifices of Diana which of them was able to endure most lasses; being

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scourged before the altar of this goddess.

BONA, by the Moors called *Balederna*, a sea-port town of the kingdom of Algiers in Africa, situated in E. Long. 7. 57. N. Lat. 36. 5. It was formerly rich, populous, capital of the province of the same name under the kingdom of Constantina, and is supposed by some to be the ancient Hippo, once the seat of the great St Austin, and a sea-port built by the Romans. The inhabitants, however, deny it to be the ancient Hippo, which had been so often taken, retaken, and destroyed by the wars; and pretend it to be since rebuilt at the distance of two or three miles from the ancient Hippo, out of its ruins, and called *Baleed-el-Ugned*, from a sort of trees of that name that grow in the neighbourhood. It is now a very mean place, poorly built, and thinly inhabited, with scarce any traces of its former grandeur, except the ruins of a cathedral, or, as others guess, of a monastery, built by St Austin about three miles distance from the city. Near these ruins is a famed spring called by his name, much resorted to by the French and Italian sailors, who come to drink of its waters, and pay their devotions to a maimed statue said also to belong to the saint, but so mutilated that no traces either of face or dress are remaining; and as each of them strives to break off some splinter, or to scrape off some part of it on account of its supposed sanctity, it will probably be soon reduced to a state of non-existence. Bona was taken by the pirate Barbarossa, and joined to his new kingdom of Algiers; but as quickly lost, and recovered by its old masters the Tunisians, who soon after lost it again. It is commanded by a little fort, in which is a garrison of about 300 Turks, under the command of an aga, who is also governor of the town. The road for the ships is good for nothing before the town, but a little farther west is very deep and safe. Dr Shaw tells us, that the continual discharging of ballast into the road, and the neglect of cleansing the port which came to the very walls, is the cause of both becoming so unsafe and incommodious; though this might be easily remedied so as to make the town one of the most flourishing in all Barbary.

BONA Dea, the good goddess, in Pagan mythology, one of the names of Cybele. Others say, she was a Roman lady, the wife of one Faunus, and was famous for her chastity, and that after her death she was deified. Her sacrifices were performed only by matrons; and in so secret a manner, that it was no less than death for any man to be present at the assembly *. This Cicero reproaches Clodius with having entered into this temple disguised as a singing woman, and having by his presence polluted the mysteries of the good goddess. What kind of mysteries these were, we may learn from Juvenal, Sat. VI. 313. The poet then mentions the adventure of Clodius.

* See *Cybele*.

*Atque ulnam ritus veteres, et publica saltem
Hic intacta malis agerentur sacra : sed omnes
Noverunt Mauri, atque Indi, quæ pultrix penem
Majorem, quam fuit duo Caesaris Anticatores,
Illuc testiculi sibi conficiis, unde fugit mus,
Intulit.*

I with at least our sacred rites were free
From these pollutions of obscenity :
But 'tis well known what finger, how disguised,
A lewd audacious action enterpriz'd :
Into the fane, with women mix'd, he went,
Arm'd with a huge two-handed instrument;

Bona
||
Bond.

A grateful present to these holy choirs,
Where the mouse, conscious of his sex, retires. DRYDEN.

BONA FIDES, in law. When a person performs any action which he believes at the time to be just and lawful, he is said to have acted *bona fide*.

BONA MOBILIA, the same with moveable effects or goods.

BONA NOTABILIA, are such goods as a person dying has in another diocese than that wherein he dies, amounting to the value of 5 l. at least; in which case the will of the deceased must be proved, or administration granted in the court of the archbishop of the province, unless by composition, or custom, any dioceses are authorized to do it, when rated at a greater sum.

BONA PATRIA, an assize of countrymen, or good neighbours, where 12 or more are chosen out of the country to pass upon an assize, being sworn judicially in the presence of the party.

BONAIRE, an island of South America, near the north coast of Terra Firma. It belongs to the Dutch; and abounds in kabritoes and salt. W. Long. 66. 18. N. Lat. 20. 16.

BONAIS, very high mountain of Italy, in the duchy of Savoy, not far from LaSoreburg: in some seasons they cannot be ascended without great danger.

BONARELLI (Gui Ubaldo), an Italian count. He was intrusted with several important negotiations, and was esteemed an able politician and learned philosopher. He was the author of a fine Italian pastoral entitled *Filli di Sciro*. He died at Fano, in 1608, aged 45.

BONAVENTURA, (the bay of), in America, on the coast next the South Sea, in the Popayan. It has a port, and harbour for ships; but the air is very unwholesome. W. Long. 75. 18. N. Lat. 3. 20.

BONAVENTURE, a celebrated cardinal, called, from his works, the *seraphic doctor*. He was born at Bagnarea, a small town of Tuscany, in 1221; and his original name was *John Fidauze*. He took the habit of a monk of the order of St Francis in 1243, became doctor of Paris in 1255, and the next year general of his order. After the death of Clement IV. the cardinals disagreeing about the election of a new pope, engaged themselves by a solemn promise to elect him who should be named by Bonaventure, even tho' it should be himself; but he chose Theobald archdeacon of Liege, who was then in the Holy Land, and took the name of *Gregory X*. This pope, in return, in 1272, made him cardinal and bishop of Alba, and ordered him to assist at the second general council of Lyons, where he died in 1274. His works were printed at Rome in 8 vols folio.

BONAVISTA, an island in the Atlantic ocean, the most easterly and first discovered of the Cape de Verd islands. It is 20 miles long, and 13 broad; has plenty of goats and cotton, and some indigo. The inhabitants are remarkable for slothfulness; they have a town and two roads where ships come to an anchor. W. Long. 23. 6. N. Lat. 16. 5.

BOND (John), a commentator on Horace and Persius, was born in Somersetshire in the year 1550, and educated at Winchester school. In 1569 he was entered a student of the university of Oxford, probably in the New college, of which he became either one of the clerks or one of the chaplains. He took his bachelor of arts degree in 1573, and that of master in 1579; soon after which he was appointed, by his col-

lege, master of the free school in Taunton in Somersetshire. In this employment he continued many years with great reputation; but being at length weary of his laborious employment, he commenced physician, and we are told became eminent in that capacity. He died in the year 1612, possessed of several lands and tenements in his neighbourhood; but whether acquired by the practice of physic, does not appear. He wrote, 1. *Commentarii in poemata Q. Horatii*, 8vo. 2. *Commentarii in sex satyras Persii*, Lon. 1614, 8vo.

BOND, in law, is a deed whereby the obligor obliges himself, his heirs, executors, and administrators, to pay a certain sum of money to another at a day appointed. If this be all, the bond is called a simple one, *simplex obligatio*. But there is generally a condition added, that if the obligor does some particular act, the obligation shall be void, or else shall remain in full force: as, payment of rent; performance of covenants in a deed; or repayment of a principal sum of money borrowed of the obligee, with interest, which principal sum is usually one half of the penal sum specified in the bond. In case this condition is not performed, the bond becomes forfeited, or absolute at law, and charges the obligor while living; and after his death the obligation descends upon his heir, who (on defect of personal assets) is bound to discharge it, provided he has real assets by descent as a recompense.

If the condition of a bond be impossible at the time of making it, or be to do a thing contrary to some rule of law that is merely positive, or be uncertain, or insensible, the condition alone is void, and the bond shall stand single and unconditional: for it is the folly of the obligor to enter into such an obligation from which he can never be released. If it be to do a thing that is *malum in se*, the obligation itself is void: for the whole is an unlawful contract, and the obligee shall take no advantage from such a transaction. And if the condition be possible at the time of making it, and afterwards becomes impossible by the act of God, the act of law, or the act of the obligee himself, there the penalty of the obligation is saved: for no prudence or foresight of the obligor could guard against such a contingency. On the forfeiture of a bond, or its becoming single, the whole penalty was recoverable at law: but here the courts of equity interposed, and would not permit a man to take more than in conscience he ought, viz. his principal, interest, and expences, in case the forfeiture accrued by non-payment of money borrowed; the damages sustained upon non-performance of covenants; and the like. And the statute 4 and 5 Ann. c. 16. hath also enacted, in the same spirit of equity, that in case of a bond, conditioned for the payment of money, the payment or tender of the principal sum due, with interest and costs, even though the bond be forfeited and a suit commenced thereon, shall be a full satisfaction and discharge.

BONDAGE, properly signifies the same with slavery, but in old law books is used for villenage *. — * See Villenage. Tenants in bondage paid kenots, and did fealty; they were not to fell trees in their own garden, without licence of the lord. The widow of a tenant in bondage held her husband's estate *quam diu vixerit sine marito*, "as long as she lived single."

BONDAGE by the Forelock, or *Bondagium per anteriores crines capitis*, was when a freeman renounced his liberty,

Bond,
Bondage.

Bondman
||
Bones.

liberty, and became slave to some great man: which was done by the ceremony of cutting off a lock of hair from the forehead, and delivering it to his lord; denoting that he was to be maintained by him for the future. Such a bondman, if he reclaimed his liberty, or were fugitive from his master, might be drawn again to his servitude by the nose; whence the origin of the popular menace to pull a man by the nose.

See Villain
and Villen-
age.

BONDMAN, in the English law, is used for a villain, or tenant in villenage &c.—The Romans had two kinds of bondmen; one called *servi*, who were those either bought for money, taken in war, left by succession, or purchased by some other lawful acquisition; or else born of their *bondwomen*, and called *vernae*. We may add a third kind of bondmen mentioned by Justinian, called *adscripti glebe*, or *agricensiti*; who were not bound to the person, but to the ground or place, and followed by him who had the land. These in our law are called *villains regardant*, as belonging to the manor or place.

BONE-ACE, a game at cards played thus: The dealer deals out two cards to the first hand, and turns up the third, and so on through all the players, who may be seven, eight, or as many as the cards will permit: he that has the highest card turned up to him, carries the bone; that is, one half of the stake; the other half remaining to be played for. Again, if there be three kings, three queens, three tens, &c. turned up, the eldest hand wins the bone. But it is to be observed, that the ace of diamonds is bone-ace, and wins all other cards whatever. Thus much for the bone; and as for the other half of the stake, the nearest to 31 wins it; and he that turns up or draws 31, wins it immediately.

BONES, their origin, formation, composition, texture, variety, offices, &c. See **ANATOMY**, Part I.

BONES Whitened for Skeletons. Two processes are described in the *Alia Hoffnensis* for whitening bones. Professor Rau had a method of giving them a great degree of whiteness. By bare exposure to the air, sun, and rain, for a length of time, they become notably white; but the whitest bones, kept in rooms tainted with smoke or fuliginous vapours, grow in a little time yellowish, brownish, and unsightly. It is customary for the purification of bones, to boil them in alkaline liquors; which, by dissolving and extracting the superfluous fat, improve their whiteness.

BONES Hardened and Softened. Boerhaave observes, that alkaline salts render bones harder and firmer, and that acids make them softer and more flexible. These effects succeed in certain circumstances, but not universally; for bones may be hardened and softened both by acids and by alkalies, according to the quantity of saline matter employed, and the manner in which it is applied. Newmann made bones harder and more compact by treating them with the strongest of the mineral acids; though, when the acid is in sufficient proportion, it destroys or dissolves them. In Papin's digester (a strong close vessel, in which the steam of boiling liquors is confined, and the fluid by this means made to undergo a greater degree of heat than it could otherwise sustain), the hardest bones are reduced in a short time, by the action of simple water, into a soft pap, or jelly; and alkaline liquors produce this effect still sooner.

In the history of the French Academy for the years 1742 and 1743, there is an account that Mr Geoffroy

produced before the academy a small ivory spoon, which, by long lying in mustard, was become flexible and transparent like horn; that Mr Fouchy saw an ivory spoon, which, by lying for a considerable time in milk, was become supple like leather; and that Mr Hunault produced bones, which had been softened by steeping in vinegar, afterwards hardened to their natural state by steeping in water, and softened a second time by steeping in vinegar. Dr Lewis observed that the nitrous and marine acids diluted, and the aceticus acid, make bones flexible and tough like leather; but that the diluted vitriolic acid, though it renders them notably soft, makes them at the same time brittle. It seems as if a great part of the earthy matter, which is the basis of the bone, and on which its hardness depends, was dissolved and extracted by the three first; whilst the latter, incapable of dissolving this kind of earth into a liquid form, only corrodes it into a kind of felenitic concrete, which remains intermixed in minute particles among the gelatinous matter. Dr Lewis did not find that the softened bones, whatever acid they were softened by, recovered their hardness by steeping in water. Slips of softened ivory, after lying above a month in water, continued nearly as soft as when they were taken out of the acid liquor.

There is a singular induration of bones produced by fire; the effects of which agent are here remarkably different according to its degree and the circumstances of its application. Bones exposed to a moderate fire, either in open vessels, or in contact with the burning fuel, become opaque, white, and friable throughout; and an increase of fire, after they have once suffered this change, renders them only more and more friable. But if they are urged at first with a strong fire, such as that in which copper or iron melts, they become hard, semitransparent, and sonorous, like the hard mineral bones. This curious experiment deserves to be further prosecuted.

Colouring of BONES. Bones may be stained of a variety of colours by the common dyeing infusions and decoctions of animal and vegetable substances. They are stained also, without heat, by metallic solutions; and by means of these may be spotted or variegated at pleasure. Thus, solution of silver in aqua fortis gives a brown or black according to its quantity; solution of gold in aqua regia or in spirit of salt, a fine purple; solution of copper in the aceticus acid, a fine green; and solutions of the same metal in volatile alkalies, a blue, which at first is deep and beautiful, but changes, upon exposure to the air, into a green or bluish-green. If the bone is but touched with the two first solutions, and exposed to the air, it does not fail to acquire the colour in a few hours: In the two latter, it requires to be steeped for a day or longer in order to its imbibing the colour. In these and other cases where immersion for some time is necessary, the bone may be variegated, by covering such parts as are to remain white, with wax or any other matter that the liquor will not dissolve or penetrate.

Economical Uses of BONES. Bones are a very useful article, not only for making different kinds of toys, but likewise in several of the chemical arts; as, For making cast iron malleable, for absorbing the sulphur of sulphureous ores; for forming tests and cupels, or vessels for refining gold and silver with lead, (burnt bones

bones composing a mass of a porous texture, which absorbs the vitrified lead and other matters, while the unvitrescible gold and silver remain entire behind; for the preparation of milky glasses and porcelains; for the rectification of volatile salts and empyreumatic oils; and for making glue. The bones of different animals are not equally fit for these uses: even the glue, or gelatinous part of the bones of one animal is notably different both in quantity and cohesiveness from that of another.

The human skull-bone, or cranium, the natural defence of the seat of sensation and perception in the noblest animal, has been recommended medicinally as a cure for epilepsies, deliria, and all disorders of the senses, from the same philosophy which ascribed antiaethmatic virtues to the lungs of the long-winded fox; and expected, because fowls are said to digest even small stones, that the skin of the gizzard, dried and powdered, would produce a similar effect in the human stomach. To such lengths of extravagance have the sons of phycic been carried by the blind superstition of former ages!

BONES in the Funeral Solemnities of the Ancients.—Divers usages and ceremonies relating to the bones of the dead have obtained in different ages; as gathering them from the funeral pile, washing, anointing, and depositing them in urns, and thence into tombs; translating them, which was not to be done without the authority of the pontiffs; not to say worshipping of them, still practised to the bones of the saints in the Romish church. Among the ancients, the bones of travellers and soldiers dying in foreign countries were brought home to be buried; till, by an express S. C. made during the Italic war, it was forbid, and the soldiers bones ordered to be buried where they died.

The Romans had a peculiar deity under the denomination of *Osifago*, to whom the care of the induration and knitting of the human bones was committed; and who, on that account, was the object of the adoration of all breeding women.

Fossile, or Petrified BONES, are those found in the earth, frequently at great depths, in all the strata, even in the bodies of stones and rocks; some of them of a huge size, usually supposed to be the bones of giants, but more truly of elephants or hippopotami. It is supposed they were repositied in those strata when all things were in a state of solution; and that they incorporated and petrified with the bodies where they happened to be lodged.

We often find in the earth petrified bones, greatest part of their gelatinous matter being extracted by the moisture, and a stony one introduced in its room. In some parts of France petrified bones are met with which have an impregnation of copper. Hence, on being calcined in an open fire, a volatile salt is produced from the remains of their gelatinous principle, and the bone is tinged throughout of a fine greenish-blue colour, copper always striking a blue with volatile alkalies. The French turquoise stones are no other than these bones prepared by calcination: they are very durable, and bear to be worked and polished nearly in the same manner as glass; without the imperfection, inseparable from glassy bodies, of being brittle. See the article *TURCOISE*.

There have lately been discovered several enormous

skeletons, five or six feet beneath the surface, on the banks of the Ohio, not far from the river Miume in America, 700 miles from the sea-coast. Some of the tusks are near seven feet long; one foot nine inches at the base, and one foot near the point; the cavity at the root or base, 19 inches deep. Besides their size, there are several other differences which will not allow the supposition of their having been elephants: the tusks of the true elephant have sometimes a very slight lateral bend; these have a larger twist, or spiral curve, towards the smaller end: but the great and specific difference consists in the shape of the grinding teeth; which, in these newly found, are fashioned like the teeth of a carnivorous animal; not flat and ribbed transversely on their surface like those of the modern elephant, but furnished with a double row of high and conic processes, as if intended to masticate, not to grind, their food. A third difference is in the thigh-bone, which is of great disproportionable thickness to that of the elephant; and has also some other anatomical variations. These fossil bones have been also found in Peru and the Brazils; and when cut and polished by the workers in ivory, appear in every respect similar. It is the opinion of Dr Hunter, that they must have belonged to a larger animal than the elephant; and differing from it, in being carnivorous. But as yet this formidable creature has evaded our search; and if, indeed, such an animal exists, it is happy for man that it keeps at a distance; since what ravage might not be expected from a creature, endowed with more than the strength of the elephant, and all the rapacity of the tiger?

BONE-Spavin. See *FARRIERY*, § xxvi.

BON-ESPERANCE, the same with the Cape of Good Hope. See *GOOD HOPE*.

BONET (*Theophilus*), an eminent physician born at Geneva, March 15th 1620. He took his degree in physic in 1643, after he had gone through most of the famous universities, and was for some time physician to the duke of Longueville. Mean while his skill in his profession got him considerable practice; but being seized with deafness, it obliged him to retire from business, which gave him leisure to collect all the observations he had made during a practice of 40 years. He wrote, 1. *Polyalthes, five Theaurus Medico Practico*, 3 vols folio. 2. *Labyrinthi Medici extricati*. 3. *Medicini Septentrionalis Collatiatio*; and other works.

BONFADIO (*James*), one of the most polite writers of the 16th century, was born in Italy, near the lake Garda. He was secretary to the cardinal de Bari, and after his death to the cardinal Ghinucci. He afterwards read public lectures on Aristotle's politics, and on rhetoric; and was made historiographer to the republic of Genoa. He applied himself to compose the annals of that state, in which he wrote too satirically on some families. This creating him enemies who were resolved to ruin him, they accused him of the unnatural sin; and, as witnesses were found to convict him of it, he was condemned to be burnt. Some say that this sentence was executed; and others, that his punishment was changed, and that he was beheaded. This was in the year 1560. Upon the day of his execution he wrote a note to John Baptist Grimaldi, to testify his gratitude to the persons who had endeavoured to serve him; and promised to inform them how he

found

Bonfinius
Boniface.

found himself in the other world, if it could be done without frightening them. But it does not appear that he performed his promise, any more than the many who had promised the like before him.—His history of Genoa is esteemed. We have also some letters, some orations, and Latin and Italian poems, of his, which were printed at Bologna, in the year 1744, octavo.

BONFINIUS (Anthony), flourished in the 15th century. He was a native of Ascoli in Italy, and attached himself to the study of the belles lettres. Matthias Cowin king of Hungary, having heard of his learning, sent for him, retained him, and settled upon him a good pension. He wrote, 1. A history of Ascoli. 2. A treatise of virginity and conjugal chastity. 3. An history of Hungary; and other works.

BONFRERIUS (James), a learned Jesuit, born at Dinant, in 1573. He wrote a commentary on the Pentateuch, and learned notes on the Onomasticon of the places and towns mentioned in the Scripture. He died at Tournay in 1643, aged 70.

BONGARS (James), in Latin *Bongarsias*, a native of Orleans, was one of the most learned men of the 16th century. He applied himself to the study of critical learning, and was for near 30 years employed in the most important negotiations of Henry IV. whose resident he was several times at the courts of the princes of Germany, and at length his ambassador. He was of the Protestant religion; and, when very young, had the courage to write and post up in Rome a very spirited answer to a bull of Pope Sixtus V. The public is obliged to him for the edition of several authors who have written the History of the expeditions to the Holy Land; he also published, among other works, an edition of Justin, in which he restored several passages that had been corrupted, by consulting valuable manuscripts, and added notes which explained many difficulties. He died in 1612, aged 58.

BONIFACE, the name of several eminent men, particularly of nine popes. To the first of these, who was chosen pope in 418, St Augustine dedicated his four books against the two epistles of the Pelagians. The third of that name prevailed upon the emperor Phocas to consent that the title of *Universal Bishop* should be conferred on no other than the bishop of Rome. Boniface IV. obtained from the same emperor, the pantheon, a famous heathen temple built by Agrippa, and converted it into a church which is now called "Our Lady della Rotunda." Several works are also attributed to him, but they appear to be spurious. Boniface VII. hath the title of *antipope*; because in 974 he caused Benedict VI. to be strangled in prison, and after the election of Benedict VII. removed the treasures of the church to Constantinople. He, however, at length returned after the death of Benedict, and caused his successor John XIV. to be murdered; but died himself soon after, and was dragged naked by the feet about the streets. Boniface VIII. canonized St Lewis in 1297, and in 1300 appointed the jubilee to be solemnized every 100 years after.

BONIFACE is also the name of a faint, who before he took that name was called *Winifred*, and was born at Kirton in Devonshire. He chose to go and preach the gospel among the barbarous nations; and though created archbishop of Mentz, soon after resigned his office, to go and preach in East Friesland, where he

was killed by the Pagans on the 5th of June 754. His letters were published by Senarius.

BONIFACIO, a town in the island of Corfica, beyond the mountains, near the straight called *Bocca di Bonifacio*. It is well fortified, and pretty populous. E. Long. 9. 20. N. Lat. 41. 25.

BONIS NON AMOVENDIS, in law, is a writ directed to the sheriffs of London, &c. charging them, that a person against whom judgment is obtained, and prosecuting a writ of error, be not suffered to remove his goods until the error is determined.

BONN, an ancient and strong city of Germany, in the Electorate of Cologn, and the usual residence of the elector. It is of great consequence in the time of war; because it is seated on the Rhine, in a place where it can stop every thing that comes down that river. It is well fortified by the elector, who has a fine palace and beautiful gardens in the city. E. Long. 7. 5. N. Lat. 50. 44.

BONNA, (anc. geog.), one of the 50 citadels built by Drusus on the Rhine; supposed by some to be the same with the *Ara Ubiorum*: now *Bonn* *.

BONNEFONS (John), a Latin poet born at Clermont in Auvergne, and lieutenant-general of Bar fur Seine, acquired great reputation by his *Pancharis*, and other poems. He died under the reign of Lewis XIII. He ought not to be confounded with John Bonnefons his son, another Latin poet.

BONNER (Edmund), bishop of London, of infamous memory, was born at Hanley in Worcestershire, and generally supposed to be the natural son of one Savage a priest; and that priest was the natural son of Sir John Savage of Clifton in the same county. Strype, however, says, he was positively assured that Bonner was the legitimate offspring of a poor man, who lived in a cottage known to this day by the name of *Bonner's place*. About the year 1512, he entered student of Broadgate Hall in Oxford. In 1519, he was admitted bachelor of the canon and civil law. About the same time he took orders, and obtained some preferment in the diocese of Worcester. In 1525, he was created doctor of canon law. Having now acquired the reputation of a shrewd politician and civilian, he was soon distinguished by cardinal Wolsey, who made him his commissary for the faculties, and heaped upon him a variety of church-preferences. He possessed at the same time the livings of Blaydon and Cherry-Burton in Yorkshire, Ripple in Worcestershire, east Derham in Norfolk, prebend of St Paul's, and the archdeaconry of Leicester. Bonner was with the cardinal at Caw-wood, when he was arrested for high treason. After the death of that minister, he soon found means to insinuate himself into the favour of Henry VIII. who made him one of his chaplains, and employed him in several embassies abroad, particularly to the pope. In 1532, he was sent to Rome, with Sir Edward Kame, to answer for the king, whom his Holiness had cited to appear in person or by proxy. In 1533, he was again dispatched to pope Clement VII. at Marfeilles, upon the excommunication of king Henry on account of his divorce. On this occasion he threatened the pope with so much resolution, that his Holiness talked of burning him alive, or throwing him into a caldron of melted lead; upon which Bonner thought fit to decamp. His infallibility did not foresee that the man whom he thus threat-

Bonifacio
Bonner.* See the
preceding
article.

Bonner
||
Bonneval.

Boneval
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Bononcini.

threatened was predestined to burn heretics in England. In 1538, being then ambassador at the court of France, he was nominated bishop of Hereford; but, before consecration, was translated to the see of London, and enthroned in April 1540.—Henry VIII. died in 1547, at which time Bonner was ambassador with the emperor Charles V. During this reign he was constantly zealous in his opposition to the pope; and, in compliance with the king, favoured the reformation. Henry VIII. was not to be trifled with; but, on the accession of young Edward, Bonner refused the oath of supremacy, and was committed to the fleet; however, he soon thought fit to promise obedience to the laws, and was accordingly released. He continued to comply with reformation; but with such manifest neglect and reluctance, that he was twice reprimanded by the privy council, and in 1549, after a long trial, was committed to the Marshalsea, and deprived of his bishopric. The succeeding reign gave him ample opportunity of revenge. Mary was scarce seated on the throne before Bonner was restored to his bishopric; and soon after appointed vicegerent and president of the convocation. From this time he became the chief instrument of papal cruelty: he is said to have condemned no less than 200 Protestants to the flames in the space of three years. Nor was this monster of a priest more remarkable for his cruelty than his impudence. When Queen Elizabeth came to the crown, he had the insolence to meet her, with the rest of the bishops, at High-gate. In the second year of her reign, refusing to take the oath of allegiance and supremacy, he was again deprived, and committed to the Marshalsea; where he died in 1569, after ten years confinement. There cannot be a stronger instance of the comparative lenity of the Protestant church, than its suffering this miscreant to die a natural death. Several pieces were published under his name.

BONNESTABLE, a town of Le Maine in France, which carries on a great trade in corn. E. Long. o. 30. N. Lat. 48. 11.

BONNET, in a general sense, denotes a cover for the head, in common use before the introduction of hats. Bonnets are still used in many parts of Scotland.

BONNET, in fortification, a small work consisting of two faces, having only a parapet with two rows of palisadoes, of about ten or 12 feet distance; it is generally raised before the salient angle of the countericarp, and has a communication with the covered way, by a trench cut through the glacis, and palisadoes on each side.

BONNET à Pretre, or *Priest's Bonnet*, in fortification, is an out-work, having at the head three salient angles, and two inwards. It differs from the double tennaille only in this, that its sides, instead of being parallel, are like the *queue d'aronde*, or swallow's tail, that is, narrowing, or drawing close at the gorge, and opening at the head.

BONNET, in the sea-language, denotes an addition to a sail; thus we say, lace on the bonnet, or shake off the bonnet.

BONNEVAL (Clausius Alexander de) count, known in the latter part of his life by the name of *Ozman Bashaw*, descended from a family related to the blood-royal of France, entered himself at the age

of 16 in the service of that crown, and married the daughter of marshal de Biron. He made the campaign in Flanders in 1690; but soon after left the French army, and entered into the imperial service under prince Eugene, who honoured him with an intimate friendship. The intrigues of the marquis de Prié, his inveterate enemy, ruined his credit, however, at the court of Vienna, and caused him to be banished the empire. He then offered his service to the republic of Venice, and to Russia; which being declined, his next tender was to the Grand Signior, who gladly received him; it was stipulated, that he should have a body of 30,000 men at his disposal; that a government should be conferred on him, with the rank of Bashaw of three tails, and a salary of 10,000 aspers a day; and that, in case of a war, he should be commander in chief. The first expedition he engaged in after his arrival at Constantinople, was to quell an insurrection in Arabia Petrea, which he happily effected; and at his return had large offers made him by Kouli Khan, but he did not choose to accept them. Some time after, he commanded the Turkish army against the emperor, over whose forces he gained a victory on the banks of the Danube. But success does not always protect a person against disgrace; for Bonneval, notwithstanding his service, was first imprisoned, and then banished to the island of Chio. The sultan, however, continued his friend; and the evening before his departure made him Bashaw-general of the Archipelago, which, with his former appointment of beglerbeg of Arabia, rendered him one of the most powerful persons in the Ottoman empire. In this island he found a retirement quite agreeable to his wishes; but did not long enjoy it, being sent for back, and made *topigi* or master of the ordnance, a post of great honour and profit. He died in this employment, aged 75, in 1747; and wrote the memoirs of his own life.

BONNEVAL, a town of France, in Beauce, with a fine Benedictine abbey. It is seated on the river Loire, in E. Long. 1. 30. N. Lat. 48. 10.

BONNEVILLE, a town of Savoy, situated on the north side of the river Arve, and subject to the king of Sardinia. E. Long. 6. 10. N. Lat. 46. 18.

BONNY, among miners, a bed of ore, differing only from a *quat* as being round, whereas the *quat* is flat. † See *Squat*.

BONNY, a town of France, in the Gatinois, seated at the confluence of a river of the same name with the Loire. E. Long. 2. 54. N. Lat. 47. 36.

BONONIA, (anc. geog.), a town of Italy, in the Gallia Cispadana; a name probably given by the Gauls, there being a *Bononia* in Gallia Belgica. Its ancient name when in the hands of the Tuscans, who were expelled by the Gauls, was *Faliska*. In the 563^d year of the city the Romans led a colony thither; which, about the beginning of the Achaean war, was increased by Augustus, and is the *Colonia Bononiensis* of Tacitus. Now *Bologna*; which see.

BONONIA, (anc. geog.), a town of Panonia Inferior, between Muria to the north-west, and Taurinum to the east.—Another Bononia, a town of Moesia Superior, on the Danube; now *Bodon*, in Bulgaria. See *BODON*.

BONONIAN. See *BOLONIAN*.

BONONCINI (Giovanni), an eminent composer of music, for some time divided the opinions of the *conoscenti* of this kingdom with respect to the comparative merits

merits of himself and the great Handel, which gave occasion for the following epigram said to have been written by Dr Swift:

Some say that Signior Bononcini
Compared to Handel's a meer ninny;
Others aver, that to him Handel
Is scarcely fit to hold the candle.
Strange! that such high disputes should be
Twixt *Tweddle Dum* and *Tweddle Dee*.

There is one opera (Italian) published, with his name prefixed to it, intitled *Pharances*; but whether the words, or only the music, are his composition, is uncertain; and indeed, in the general, the language of those pieces written merely for musical representation, is so extremely paltry, and so opposite to every thing that can be deemed poetry, that the greatest compliment that can be paid to the authors of them is, to suffer their names to lie buried in the shades of obscurity.

BONOSIANI, or BONOSIACI, an ancient branch of *Adoptians*, in the fourth century, denominated from their leader Bonosus, a bishop of Macedonia. The Bonosiani were prior to the Feliciani, and even to Nestorius; whence some rather consider them as a branch of Arians. They allowed Christ to be no otherwise the Son of God than by adoption.

BONPOURNICKEL, a coarse kind of bread used in Westphalia. See BREAD.

BONTIA, WILD OLIVE OF BARBADOES; a genus of the angiospermia order, belonging to the didymia class of plants. Of this genus there are two species, the daphnoides and the germinans. The first hath a woody stem and branches; rising to the height of ten feet, with narrow, smooth, thickish leaves, crenated at the edges; and flowers from the sides of the branches, succeeded by large oval fruit that sometimes ripen in England. This species is greatly cultivated in the gardens at Barbadoes for making of hedges; for which purpose it is exceedingly proper, it being an evergreen of very quick growth. It is said, that from cuttings planted there in the rainy season, when they have immediately taken root, there has been a complete hedge, four or five feet high, in 18 months. The second sort has been reckoned by many botanic writers to be a species of the mangrove tree, as it grows in swamps, which they also do. It rises 14 or 16 feet high, sending out several small branches which incline downward toward the water, and as soon as they reach that, put out roots into the mud, whereby they propagate very fast: these branches are garnished with leaves placed opposite; they are of a thick substance like those of the bay tree, about two inches long and one broad, very smooth on their surface: the flowers are white, and come out in spikes from the upper branches. This hath been also by some supposed to be the anacardium orientale. These plants are easily propagated, either by seeds or cuttings, sown or planted on a hot-bed; but they must be kept constantly in the stove.

BONUS HENRICUS. See CHENOPodium.

BONZES, Indian priests. The Tonquinese have a pagod or temple in each town; and each pagod has at least two bonzes belonging to it: some have 30 or 40. These bonzes, in order to distinguish themselves from the laity, wear a chaplet about their necks consisting of 100 beads; and carry a staff, at the end of which is a wooden bird. They live upon the alms of the people; yet are very charitably disposed, and main-

tain several orphans and widows out of their own collections.

The bonzes of China are the priests of the Fohists, or sect of Fohi. It is one of their established tenets, that there are rewards allotted for the righteous, and punishments for the wicked, in the next world; and that there are various mansions in which the souls of men will reside, according to their different degrees of merit. But, in order to deserve the favour of heaven, the bonzes instruct the people to treat the priests with respect and reverence, to support and maintain them, and to erect temples and monasteries for them. They tell them, that, unless they comply with these injunctions, they will be cruelly tormented after death, and pass through a disagreeable variety of transmigrations: in short, that they will be changed into mules, asses, rats, and mice.

The Chinese bonzes, according to F. le Compte, are no better than a gang of dissolute idle fellows. All their aim is to incite people to commiserate their abject condition: to which end they have recourse to several tricks and impostures. When the common arts of address fail them, they try what public acts of penance will do. Some of them drag heavy chains 30 feet long after them; some sit in the highway knocking their heads against flint-stones; others set particular drugs on fire upon their heads: all these are several ways of drawing the attention and exciting the compassion of the people, and they seldom fail of success.

The bonzes of Japan are, for the generality, gentlemen of the highest extraction; for when a gentleman of quality finds his family grow too numerous, nay, when he has only two sons, he generally makes the youngest a bonze, to prevent all domestic broils and confusions. These priests are dressed in various colours; their apartments are very commodious, and situated in the healthiest parts of the country.

F. Navarette tells us, that the bonzes are obliged to chastity; and that, on the 24 of April 1667, a petty king of Canton had condemned 11 of them to be burnt alive for incontinence. He adds, that it was reported of an empress of the last reigning family, who had a particular kindness for the bonzes, that she granted them a dispensation for the use of women during three days. The bonzes of China, according to the same author, are computed at 50,000.

BOOBY, in ornithology. See PELICANUS.

BOOK, the general name of almost every literary composition; but, in a more limited sense, is applied only to such compositions as are large enough to make a volume. As to the origin of books or writing, those of Moses are undoubtedly the most ancient that are extant: But Moses himself cites many books that behaved to be written before his time.

Of profane books, the oldest extant are Homer's poems, which were so even in the time of Sextus Empiricus; though we find mention in Greek writers of seventy others prior to Homer; as Hermes, Orpheus, Daphne, Horus, Linus, Musæus, Palamedes, Zoroaster, &c.: but of the greater part of these there is not the least fragment remaining; and of others, the pieces which go under their names are generally held, by the learned, to be supposititious.

Several sorts of materials were used formerly in making books: Plates of lead and copper, the barks of trees,

trees, bricks, stone, and wood, were the first materials employed to engrave such things upon as men were willing to have transmitted to posterity. Josephus speaks of two columns, the one of stone, the other of brick, on which the children of Seth wrote their inventions and astronomical discoveries: Porphyry makes mention of some pillars, preserved in Crete, on which the ceremonies practised by the Corybantes in their sacrifices were recorded. Hesiod's works were originally written upon tables of lead, and deposited in the temple of the Muses, in Boeotia: The ten commandments, delivered to Moses, were written upon stone; and Solomon's laws upon wooden planks. Tables of wood, box, and ivory, were common among the ancients: When of wood, they were frequently covered with wax, that people might write upon them with more ease, or blot out what they had written. The leaves of the palm-tree were afterwards used instead of wooden planks, and the finest and thinnest part of the bark of such trees, as the lime, the ash, the mapple, and the elm; from hence comes the word *liber*, which signifies the inner bark of the trees: and as these barks are rolled up, in order to be removed with greater ease, these rolls were called *volumen*, a volume; a name afterwards given to the like rolls of paper or parchment.

Thus we find books were first written on stones, witness the Decalogue given to Moses: Then on the parts of plants, as leaves chiefly of the palm-tree; the rind and barks, especially of the tilia, or phillyrea, and the Egyptian papyrus. By degrees wax, then leather, were introduced, especially the skins of goats and sheep, of which at length parchment was prepared: then lead came into use; also linen, silk, horn, and lastly paper itself.

The first books were in the form of blocks and tables; but as flexible matter came to be wrote on, they found it more convenient to make their books in the form of rolls: These were composed of several sheets, fastened to each other, and rolled upon a stick, or *umbilicus*; the whole making a kind of column, or cylinder, which was to be managed by the umbilicus as a handle, it being reputed a crime to take hold of the roll itself: The outside of the volume was called *frons*; the ends of the umbilicus, *cornua*, which were usually carved, and adorned with silver, ivory, or even gold and precious stones: The title *συνάκρος*, was struck on the outside; the whole volume, when extended, might make a yard and a half wide, and fifty long. The form which obtains among us is the square, composed of separate leaves; which was also known, tho' little used, by the ancients.

To the form of books belongs also the internal economy, as the order and arrangement of points and letters into lines and pages, with margins and other appurtenants. This has undergone many varieties. At first the letters were only divided into lines; then into separate words; which, by degrees, were noted with accents, and distributed, by points and stops, into periods, paragraphs, chapters, and other divisions. In some countries, as among the orientals, the lines began from the right and ran leftward; in others, as the northern and western nations, from left to right; others, as the Greeks, followed both directions, alternately going in the one, and returning in the other, called *boustrophedon*: In most countries, the lines run from one side

to the other; in some, particularly the Chinese, from top to bottom.

Everlasting Book.—We find in Signior Castaquo's account of the asbestus, a scheme for the making of a book, which, from its imperishable nature, he is for calling the *book of eternity*. The leaves of this book were to be of the asbestus paper, the covers of a thicker sort of work of the same matter, and the whole sewed with thread spun from the same substance. The things to be commemorated in this book were to be written in letters of gold; so that the whole matter of the book being incombustible, and everlastingly permanent against the force of all the elements, and subject to no changes from fire, water, or air, must remain for ever, and always preserve the writing committed to it. He carried this project so far towards execution, as to find a way of making a sort of paper from the asbestus, which was so tractable and soft, that it very well resembled a thin parchment; this, by the same process, was capable of being thickened or thinned at pleasure, and in either state equally resisted the fire. The covering of the thinnest kind of this paper with fire, only makes it red hot and very clear, the fire seeming to pass through it without waiting or altering any part of it. Copper, iron, or any other metal except gold or silver, exposed to the same degree of fire in the same thin plates, would be found not to bear it in this manner, but to scale, and burn it into scoræ at the surface, which this stone does not.

Book-Binding. The art of gathering together and sewing the sheets of a book, and covering it with a back, &c. It is performed thus: The leaves are first folded with a folding-stick, and laid over each other in the order of the signature; then beaten on a stone with an hammer, to make them smooth and open well; and afterwards pressed. They are sewed upon bands, which are pieces of cord or packthread; six bands to a folio book; five to a quarto, octavo, &c.; which is done by drawing a thread through the middle of each sheet, and giving it a turn round each band, beginning with the first and proceeding to the last. After this the books are glued, and the bands opened and scraped, for the better fixing the pasteboards; the back is turned with a hammer, and the book fixed in a press between two boards, in order to make a groove for fixing the pasteboards; these being applied, holes are made for fixing them to the book, which is pressed a third time. Then the book is at last put to the cutting press, betwixt two boards; the one lying even with the press, for the knife to run upon; the other above it, for the knife to run against: after which the pasteboards are squared.

The next operation is the sprinkling the leaves of the book; which is done by dipping the brush into vermilion and sap-green, holding the brush in one hand, and spreading the hair with the other; by which motion the edges of the leaves are sprinkled in a regular manner, without any spots being bigger than the other.

Then remains the covers, which are either of calf-skin or of sheep-skin: these being moistened in water, are cut out to the size of the book; then smeared over with paste made of wheat-flour; and afterwards stretched over the pasteboard on the outside, and doubled over the edges withinside; after having first taken off the

the four angles, and indented and platted the cover at the head-band : which done, the book is covered, and bound firmly between two bands, and then set to dry. Afterwards it is washed over with a little paste and water, and then sprinkled with a fine brush, unless it

should be marbled; when the spots are to be made larger by mixing the ink with vitriol. After this the book is glazed twice with the white of an egg beaten, and at last polished with a polishing iron passed hot over the glazed cover.

B O O K - K E E P I N G

IS the art of recording mercantile transactions in a regular and systematic manner.

1. A merchant's books should contain every particular which relates to the affairs of the owner. They should exhibit the state of all the branches of his business, the connection of the different parts, the amount and success of the whole. They should be so full and so well arranged, as to afford a ready information in every point for which they may be consulted.

The matter which the books should contain is comprehended under the three following heads : First, The debts which are owing to the owner, and the debts which he owes to others. Secondly, The goods and other articles of property which belonged to him; the quantity and value sold, or otherwise disposed on; and the quantity and value which still remain in his possession. Thirdly, The amount of his stock when the books were opened; the profits he has obtained, and the losses he has suffered, since; and the amount of his stock at present.

That method of book-keeping which answers these purposes most clearly and concisely, is the best. The Italian method by *double entry*, is generally preferred; at least, it is founded upon the most universal principles, and is the most convenient in extensive and complicated business: and the accountant who understands it, will find little difficulty in following, or even in inventing other methods that are better accommodated to any particular purpose.

The Italian method requires three principal books; the Waste-Book, Journal, and Leger.

SECT. I. Of the WASTE-BOOK.

2. The waste-book, or day-book, contains an exact register of all occurrences in business in the same order as they take place. It begins with an inventory of every thing belonging to the owner, a list of the debts due to him, and of the debts he owes to others: It is carried on with a full relation of all the money he receives or pays; of all the goods he buys or sells; and of every other occurrence in his business. Each article should be entered as soon as the transaction takes place, and should be clearly expressed in the plainest language. It should require no supply from the accountant's memory, but should be fully intelligible to any person, however unacquainted with the business: at the same time, it should be written with all convenient brevity; and, therefore, sometimes refers to invoices and other accounts, for particulars. The accountant's first care should be to have nothing defective or ambiguous; his second, to have nothing superfluous.

3. The date is written in text on the top of each page. The articles are separated from each other by

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a line; and the transactions of one day are separated from those of another by a double line, in the middle of which there is left a blank space for inserting the day of the month. This book must be kept with the greater care, as it contains the materials from which the other books are composed; and any error or defect will occasion a like one in the others. Besides, it is the book whose authority is trusted to, and which must be exhibited to judges, or arbiters, when an account is disputed. As the journal is filled up from the waste-book, the authority of the former is esteemed more authentic, unless there be an obvious mistake through hurry; and either of these books is depended on rather than the ledger, which, from its form, is more liable to error, and may be more easily vitiated by a fraudulent design.

4. As the waste-book contains the whole substance of the business, it may be applied to as to afford any information that can be wanted: but the labour of consulting it would be very great. For instance, if it were required to know how much any person owes us, we must look over the book from the beginning, and mark down every article in which we have dealt with him: or, if it were required to know what quantity of goods we should have on hand, we must look over the whole book, and mark down every article bought or sold. This operation would not only be found very tedious, but much exposed to the risk of omissions. To prevent these inconveniences, another book is used, in which the articles are arranged in a methodical order. This book is called the *Leger*, and we shall consider it next; because the journal, though it comes before it in the order of writing, cannot be well understood, till the nature of the ledger be explained.

SECT. II. Of the LEGER.

5. In the ledger, articles of the same kind are collected together; and, for that purpose, it is divided into many accounts, under which the different branches of business are arranged. Each account is introduced by a proper title, to explain the nature of the articles it contains; and articles of opposite kinds, which belong to the same account, are placed on the opposite pages of the same folio: for instance, money received on the one side, and money paid on the other; or goods bought on the one side, and goods sold on the other. The left-hand page is called the *Debtor* or *Dr.* side of the account, and the right-hand page the *Creditor* or *Cr.* side. The difference between the sums of the *Dr.* and *Cr.* sides is called the *Balance*.

Accounts in the ledger are of three kinds, which answer to the three purposes of book keeping mentioned § 1.

6. First, Personal Accounts. It is necessary to

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open

open an account for every person or company with whom there are any dealings on credit. At opening the books, if they be indebted to the owner, the debt is entered on the Dr.; but, if he be indebted to them, it is entered on the Cr. During the course of the business, goods sold on trust, money paid, and every thing for which they are accountable to him, is entered on the Dr.; but goods bought on trust, money received, and every thing for which he is accountable to them, is entered on the Cr. The balance shews how much they owe him, when the Dr. side is greatest; and how much he owes them, when the Cr. side is greater.

7. Secondly, Real Accounts. By this we understand accounts of property of whatever kind, such as ready money, goods, houses, lands, ships, shares in public companies, and the like.

The account of ready money is entitled *Cash*. On the Dr. side, the money on hand at opening the books is entered, and afterwards every article of money received. On the Cr. side, there is entered every article of money paid out; and the balance shows how much ought to be on hand. The sum of the Dr. side of this account is always greater than that of the Cr. side.

8. Accounts of goods are generally ruled with inner columns for entering the quantities. When the books are opened, the goods on hand are entered on the Dr. side of the respective accounts; the quantities being placed in the inner, and the values in the outer column. Goods bought are entered in the same manner, and goods sold are entered on the Cr. side; the quantities and values being placed in the proper columns. Charges laid out on goods are entered on the Dr. side; and, when an incidental advantage arises from them, such as public bounty, it is entered on the Cr.

If the sums of the inner columns on the opposite sides be equal, it shows that the goods are all sold, and then the balance of the money-column shows the gain or loss. If the Cr. side be greater, it is gain; if the Dr. side be greater, it is loss. If the sum of the inner column be greater on the Dr. side, it shows that part of the goods are on hand; and their value must be added to the sum of the Cr. side, in order to determine the gain or loss.

9. If there be two or more kinds of the same sort of goods, they may be entered in the same account, allowing as many inner columns as there are kinds, and entering the quantities of each kind in the inner column reserved for it. This method exhibits the gain or loss on the whole goods; but does not shew how much of it arises from each kind.

Or, a separate account may be opened for each kind, distinguishing the titles by the qualities, or by some other mark. Thus, one account may be kept for fine linen, another for coarse linen; one for port-wine crop 1772, another for port-wine crop 1773; one for rum from Jamaica, another for rum from Barbadoes. This method shews the gain or loss on each kind.

When there are more kinds than can be conveniently introduced in the same account, they may be divided into several classes, each class being placed in a separate account; and the particular kinds distinguished in inner columns. Thus the account of fine linen may be divided into several columns, for different kinds, distinguished by the number of threads in the breadth, or by any other convenient character.

10. Accounts of ships contain on the Dr. the value of the ship when the books are opened, and all expenses laid out thereon; on the Cr. all freights received. In like manner, accounts of houses or lands have the value of the subject, and all repairs, or other charges, entered on the Dr. and all rents or other profits received on the Cr. If the subject be sold in whole or in part, the sale is entered on the Cr. And the balance, after valuing the subject (if any) on hand, shows the gain or loss.

Accounts of property in the public funds, or shares in companies, public or private, contain the value, or money paid in, on the Dr. and the dividends received on the Cr. and are balanced as other real accounts.

Some persons open accounts for household furniture, plate, jewels, books, or the like. The entries on these accounts are made in the same manner.

In general, real accounts contain the value of the property, and all charges on the Dr. and the sales and other returns on the Cr. When the account is to be balanced, if any property remains, the value thereof is placed on the Cr.; and then the balance shows the loss or gain, according as the Dr. or Cr. side is greatest.

11. Thirdly, Accounts of Stock, Profit and Loss, and its subsidiary accounts, which are sometimes called *fictitious accounts*.

The *stock account* contains on the Dr. the amount of the debts which the owner owes when the books are opened; and, on the Cr. the amount of ready money, goods, debts, and property of every kind belonging to him: therefore the balance shows what his net stock is; or, in case of bankruptcy, how much his debts exceed his effects. There is nothing further entered on this account till the books are balanced: and then, if the business has yielded profit, the net gain is entered on the Cr.; if it has been unsuccessful, the net loss is entered on the Dr.: after which, the balance shows the net stock at the time the books are closed.

12. The *Profit and Loss* account contains every article of gain on the Cr. and every article of loss on the Dr. The balance shews the net gain or loss, and is transferred to the proper side of the stock-account, as mentioned above. This account is partly composed of articles that occur while the books are running. For example, legacies received are entered on the Cr. goods destroyed on the Dr. The rest of the articles are those of gain and loss, arising from the real accounts, which are collected when the books are balanced.

13. It has been found convenient to open several subsidiary accounts, in order to shorten and methodize that of profit and loss. These contain certain articles of gain or loss, which may be reduced under distinct heads. They are in effect to many parts of the profit and loss account, and their balances are entered on the proper side of that account when the books are closed. The chief of these accounts are the following.

Interest account, Which contains on the Dr. sums paid or incurred for interest; and on the Cr. sums received, or become due for the same.

Commission account, Which contains on the Cr. articles of gain received or owing us for our trouble in transacting business for others. There are seldom any entries on the Dr.

Charges merchandize, Which contains on the Dr. all charges paid or incurred on the business, which do not

not belong to any particular account, as shop-rent, public burdens for trade, clerks wages, postages, and the like. If any of these should afterwards be charged to some other account, the sum so charged is entered on the Cr.

Proper expenses, Which contains on the Dr. money or any thing else, withdrawn from the trade for our private use. There are seldom any entries on the Cr. The amount of this account, as well as the former, is not properly loss; but as it has the same effect in diminishing the stock, it is placed in the same manner to the Dr. of profit and loss.

Loss by bad debts, Which contains on the Dr. such debts as we reckon desperate; and on the Cr. any of these which may happen to be unexpectedly recovered.

Account of abatements, Which contains on the Dr. discounts allowed by us on payments received; on the Cr. discounts (if any) allowed to us on payments made. It is particularly useful in retail business, where discounts are often given, to shew how much they amount to.

Insurance account, Which contains on the Cr. premiums received for making insurances; and, on the Dr. losses sustained on the same. There may be several accounts of this kind, such as insurance against sea hazard, which is the most common; insurance against fire; insurance of lives; and insurance of debts. The balance shows the gain or loss which arises from being concerned in insurance.

More or fewer of these accounts may be used, according as the articles are frequent; and others may be invented to suit the purposes of the business which the books are kept for.

14. Every simple transaction in business belongs to two accounts, and must be entered on the Dr. of the one, and on the Cr. of the other. Thus, when a person becomes indebted to us, the article he owes must be entered on the Dr. of his account; and, if it be for money paid him, it is also entered on the Cr. of cash; if for goods sold, it is entered on the Cr. of the account of goods; if for any thing delivered him by another person at our desire, it is entered on the Cr. of the deliverer's account; if for any wager or bargain, by which we are gainers, it is entered on the Cr. of profit and loss. Thus, in whatever way the debt arises, it is entered on the Cr. of some other account, as well as on the Dr. of the persons account who owes it.

In like manner, when we become indebted to any person, the article we owe must be entered on the Cr. of his account. If it be for money received, it is also entered on the Dr. of cash; if for goods bought, it is entered on the Dr. of the account of goods; if for any thing delivered to another person at our desire, it is entered to the Dr. of the receiver's account; and if it be in consequence of a losing bargain, it is entered on the Dr. of profit and loss.

Again, when goods are received, the transaction is entered on the Dr. of the account of goods. If they be bought for ready money, it is also entered on the Cr. of cash; if on trust, it is entered on the Cr. of the seller; if they be exchanged for other goods, it is entered on the Cr. of the goods delivered; if they be obtained by some profitable business, without any return, it is entered on the Cr. of profit and loss.

When goods are delivered, the transaction is entered

on the Cr. of the account of goods; and, if they be sold for ready money, it is also entered on the Dr. of cash; if on credit, it is entered on the Dr. of the purchaser; if exchanged for other goods, it is entered on the Dr. of the goods received; and, if they be given gratis, or destroyed, it is entered on the Dr. of profit and loss.

Lastly, When any article of loss occurs, the transaction is entered on the Dr. of profit and loss; and as we must either pay it in money or goods, or remain indebted to some person for it, it must be entered on the Cr. of cash, or of goods delivered, or of the person intitled to receive it. And, when an article of gain occurs, it is entered on the Cr. of profit and loss, and also on the Dr. of cash or goods, if money or goods be received; and on the Dr. of the person accountable for it, if not immediately paid.

Thus, every article in any account, whether personal or real, or belonging to profit and loss, corresponds to some other article on the opposite of a different account. The same sum is entered on the Dr. of one account, and on the Cr. of the other; and it follows from this, that, *If all the accounts in the ledger be added, the amount of the sums of the Dr. will be equal to those of the Cr.*

SECT. III. Of the JOURNAL.

15. THE journal is a fair record of all the transactions compiled from the waste-book, in the same order as they stand there; but expressed in a technical style, that it may be transferred to the ledger with more ease.

When we are to enter any article in the journal, we must consider which accounts in the ledger it will require to be placed to, both on the Dr. and Cr. and write [*the former account*] Dr. to [*the latter account*]; then we annex an explanation of the article, and place the sum in the money-column.

EXAMPLE.

Waste-book.) Sold for ready money, 30 yards linen, at 3 s L 4 10 —
Journal.) Cash Dr. to Linen. Sold 30 yards, at 3 s L 4 10 —

Here we consider, that the article must be entered on the Dr. of cash, because money is received; and on the Cr. of linen, because linen is delivered: Therefore we write *Cash Dr. to Linen*, to which we annex the nature of the transaction. The article thus entered is called a *journal-post*; *Cash* is called the *Dr.*; *Linen* the *Cr.*; the words "*Cash Dr. to Linen*," the *Entry*, and the following words the *Narration*.

The purpose of expressing the article in this form, is to point out the accounts in the ledger, to which it will require to be posted, and thereby enable the accountant to write the ledger with more ease than he could do if it were filled up immediately from the waste-book.

The learner will be able, from this example, to enter any simple article in the journal, providing he knows the accounts to which it should be posted on the Dr. and Cr. of the ledger. This must be collected from the description of the ledger accounts already given, § 6—13. and the nature and tendency of the article.

16. GENERAL RULES for the JOURNAL-ENTRIES.

I. Every thing received, or person accountable to us, is Dr.

II. Every thing delivered, or person to whom we are accountable, is Cr.

17. As the whole art of writing the journal depends on a proper choice of the Drs. and Crs. we shall give some particular rules for the most common cases, and a few examples for the illustration and practice of each.

Rule I. *The person to whom any thing is delivered is Dr. to the thing delivered, when nothing is received in return.*

Therefore when money is paid, the receiver is Dr. to cash.

When goods or other property is sold on credit, the purchaser is Dr. to the thing sold. Thus,

Waste-book.) Paid John Bell in full L 52 — —

Journal.) *John Bell Dr. to Cash*, paid him in full, 52 — —

Waste-book.) Sold 50 yards cloth to J. Hill, at 12s 30 — —

Journal.) *J. Hill Dr. to Cloth*, sold him 50 yards, at 12s 30 — —

18. Rule II. *A thing received is Dr. to the person from whom it is received, when nothing is delivered in return.*

Therefore, when money is received, Cash is Dr. to the payer: when goods are bought, the goods are Dr. to the seller. Thus,

Waste-book.) Received from Thomas Gay in full L 72 — —

Journal.) *Cash Dr. to Thomas Gay*, received in full 72 — —

Waste-book.) Bought from J. Hawley 60 lb. wool, at 9d 2 5 —

Journal.) *Wool Dr. to J. Hawley*, bought 60 lb. at 9d 2 5 —

19. Rule III. *A thing received is Dr. to the thing given for it.*

Therefore goods bought for ready money are Dr. to cash.

When goods are sold for ready money, Cash is Dr. to the goods.

When goods are bartered, the goods received are Dr. to the goods delivered. Thus,

Waste-book.) Bought for ready money 10 hds. wine, at L 15 L 150 — —

Journal.) *Wine Dr. to Cash*, bought 10 hds. at L 15 150 — —

Waste-book.) Sold for ready money 100 gallons rum, at 9s 45 — —

Journal.) *Cash Dr. to Rum*, sold 100 gallons, at 9s 45 — —

Waste-book.) Bartered 3 hds. wine, at L 15, for 100 gallons rum, at 9s 45 — —

Journal.) *Rum Dr. to Wine*, received 100 gallons at 9s in barter for 3 hds. at L 15 45 — —

20. Rule IV. *Goods and other real accounts are Dr. for all charges laid out on them. If money be laid out,*

they are Dr. to Cash; if any thing else be delivered, they are Dr. to the thing delivered; if the charge be taken on trust, they are Dr. to the person to whom it is due. Thus,

Waste-book.) Paid for repairs to ship Traffic, L 18 — —

Journal.) *Ship Traffic Dr. to Cash*, paid for repairs, 18 — —

Waste-book.) Delivered wood from my timber-yard for repairing the Angel-tavern 15 — —

Journal.) *Angel-tavern Dr. to Wood*, delivered for repairing the same 15 — —

Waste-book.) Due to William Carpenter for repairs to the Angel-tavern 12 — —

Journal.) *Angel-tavern Dr. to William Carpenter*, due him for repairs 12 — —

21. Rule V. *When rents of houses or lands, freights of ships, bounties on goods, or any other profits from real accounts, are received, Cash is Dr. to the account from which the profit arises: if any thing besides money be received, the article received is Dr.: if they remain unpaid, the person who owes them is Dr.* Thus,

Waste-book.) Received freight of the ship Traffic for a voyage to London L 35 — —

Journal.) *Ship Traffic Dr. to Cash*, received freight to London 35 — —

Waste-book.) Received 100 barrels salmon, being the rent of Inver fishery, at 52s 260 — —

Journal.) *Salmon Dr. to Inver fishery*, received the rent, being 100 barrels, at 52s 260 — —

Waste-book.) John Public owes me a year's rent of the Angel-tavern 52 — —

Journal.) *John Public Dr. to Angel-tavern*, for a year's rent due by him 52 — —

22. Rule VI. *When an article of loss occurs, Profit and Loss, or some subsidiary account, is Dr. If the loss be paid in ready money, it is Dr. to Cash; if it be paid in any thing else, it is Dr. to the thing delivered. If it remain unpaid, it is Dr. to the person to whom it is owing.* Thus,

Waste-book.) Given my daughter at her marriage L 500 — —

Journal.) *Profit and Loss Dr. to Cash*, given my daughter at her marriage 500 — —

Waste-book.) Taken for family use from my granary 3 bolls meal, at 13s 4d 2 — —

Journal.) *Profit and Loss [or Proper expenses] Dr. to Meal*, taken for family use 3 bolls, at 13s 4d 2 — —

Waste-book.) Due James Rich for a year's interest on L. 1000, at 4 per cent 40 — —

Journal.) *Profit and Loss [or Interest account] Dr. to James Rich*, due him a year's interest on L. 1000 at 4 per cent. 40 — —

23. Rule VII. *When an article of gain occurs, that is not immediately connected with any real account, Cash, the article received, or the person accountable for it, is Dr. to Profit and Loss, or to some subsidiary account.* Thus,

Thus,

Waste-book.) Received in a gift from my father,	L 100 — —
Journal.) <i>Cash Dr. to Profit and Loss</i> , received from my father	100 — —
Waste-book.) Received in like manner at opening shop, 100 yards cloth at 12 s	60 — —
Journal.) <i>Cloth Dr. to Profit and Loss</i> , received from my father at opening shop 100 yards, at 12 s	60 — —
Waste-book.) James Barbour owes me a year's interest of L. 1000	50 — —
Journal.) <i>James Barbour Dr. to Profit and Loss</i> [or <i>Interest account</i>] due by him for a year's interest of L. 1000	50 — —

24. Rule VIII. *When one person pays money, or delivers any thing else to another on our account, the person who receives it is Dr. to the person who pays it.* Thus,

Waste-book.) James Goldsmith has paid the bank of Scotland on my account	L 100 — —
Journal.) <i>Bank of Scotland Dr. to James Goldsmith</i> , paid them by him	100 — —
Waste-book.) Arthur Young has delivered James Baker 100 quarters wheat, for which I am to account to him, at 30 s	150 — —
Journal.) <i>James Baker Dr. to Arthur Young</i> , for 100 quarters wheat delivered him on my account, at 30 s	150 — —

Payments of this kind are often transacted by bills of exchange.

25. These examples will make the learner acquainted with the form of the journal, and the rules extend to the greatest part of the simple transactions that occur in domestic trade. We may observe, that the technical sense of the words *Dr.* and *Cr.* has an analogy to their meaning in common language, but is not precisely the same. Thus, in *Ex. 1.* Rule VIII. the journal-entry is, *Bank of Scotland Dr. to James Goldsmith*; by which we are not to understand that the bank is indebted to James Goldsmith; for a debt between them has no connection with our business; and therefore ought not to be entered in our books: the meaning of the entry is, that the bank becomes indebted to us by the transactions narrated; and that we become indebted to James Goldsmith by the same.

26. An article which contains more Drs. or more Crs. than one, is called a *complex post*. The form of these will appear from the following examples,

<i>Ex. 1.] Sold William Drapier,</i>	
25 pieces cloth, at L. 15	
per piece	L. 375 — —
150 stones wool, at 5 s 6 d	
per stone	35 15 — —
	L. 410 15 — —

If the two articles sold to William Drapier were entered separately in the waste-book, and transferred to

the journal by Rule I. they would stand thus:	
<i>William Drapier Dr. to Cloth</i> , fold him	
25 pieces, at L. 15	L. 375 — —
<i>William Drapier Dr. to Wool</i> , fold him	
150 stones, at 5 s 6 d	35 15 — —
And if these were posted to the ledger, there would be two articles placed to the Dr. of William Drapier, one to the Cr. of Cloth, and one to the Cr. of Wool.	
But the sales may be entered in the form of one complex journal post, as follows:	
<i>William Drapier Dr. to Sundries,</i>	
<i>To Cloth</i> , for 25 pieces,	
at L. 15	L. 375 — —
<i>To Wool</i> , for 150 stones,	
at 5 s 6 d	35 15 — —
	L. 410 15 — —

And then there is only one article on the Dr. of William Drapier in the ledger.

<i>Ex. 2.] Sold 10 pieces cloth to W. Drapier,</i>	
at L. 15	L. 150 — —
12 ditto to J. Mercer, at do	180 — —
	L. 330 — —

This example also falls under Rule I. But whereas there was one Dr. and two Crs. in the former example, there are two Drs. and one Cr. in this: William Drapier and John Mercer, the purchasers, are Drs. for their respective quantities; and cloth, which is the only thing delivered, is Cr. for the whole quantity. The journal post is,

<i>Sundries Drs. to Cloth,</i>	
<i>W. Drapier</i> , for 10 pieces, at 15 l.	L. 150 — —
<i>J. Mercer</i> , for 12 ditto at 15 l.	180 — —
	L. 330 — —

<i>Ex. 3.] Bought from H. Hood,</i>	
5 puncheons rum, at L. 42,	L. 210 — —
3 hds. claret, at 33,	99 — —
2 pipes madeira, at 56,	112 — —
	L. 421 — —

This example falls under Rule II. The articles received, rum, claret, and madeira, are Drs.; and the person from whom they are received is the only Cr.

<i>Sundries Dr. to Henry Hood,</i>	
<i>Rum</i> , for 5 puncheons, at 42 l.	L. 210 — —
<i>Claret</i> , for 3 hds. at 33,	99 — —
<i>Madeira</i> , for 2 pipes, at 56,	112 — —
	L. 421 — —

<i>Ex. 4.] Bt. 50 qrs. wheat from J.</i>	
Tull, at 35 s	L. 87 10 — —
12 from S. Ellis, 36 s 2 1/2	12 — —
	L. 109 2 — —

This example also falls under Rule II. There is only one Dr. wheat being the only thing received; and two Crs. because it is received from different persons.

<i>Wheat Dr. to Sundries.</i>	
<i>To J. Tull</i> , for 50 qrs. at 35 s	L. 87 10 — —
<i>To S. Ellis</i> , for 12 qrs. 36 s	12 12 — —
	L. 109 2 — —

In like manner, examples might be given of complex posts under every rule, which contained either several Drs. or several Crs.; but, as it is unnecessary to enlarge so far, we shall only add a few examples of cases, in which the different parts of the complex article fall under different rules.

Ex. 5.] Sold 150 qrs. beans to A. Arnot,	
at 13s 4d	L. 100 — —
75 ditto to S. Berry,	
at 13s 4d	50 — —
18 ditto, for ready money, 13s 2d	11 17 —
243	L. 161 17 —

Here beans are delivered, some to different purchasers on trust, and some for ready money. The purchasers are Drs. for the quantities sold to each, by Rule I.; Cash is Dr. for the quantity sold for ready money, by Rule III.; and beans are Cr. for the whole.

<i>Sundries Dr. to Beans.</i>	
A. Arnot for 150 qrs. at 13s 4d	L. 100 — —
S. Berry, for 75 13s 4d	50 — —
Cash, for 18 13s 2d	11 17 —
	L. 161 17 —

Ex. 6.] Bought from David Young	
8 cwt. 3 qrs. copper, at L. 12 per cwt.	L. 105 — —
Paid in part,	L. 50 — —
Balance,	55 — —
	L. 105 — —

Here the article received, copper, is the only Dr.; but, as it is bought partly for ready money, and partly on credit, it is Dr. to Cash for the value of the former, by Rule III. and to the seller for the value of the latter, by Rule II.

<i>Copper Dr. to Sundries,</i>	
For 8 cwt. 3 qrs. at L. 12 per cwt.	L. 105 — —
<i>To Cash in part,</i>	L. 50 — —
<i>To D. Young, for balance due him,</i>	55 — —
	L. 105 — —

Ex. 7.] James Willson being bankrupt, I have accepted a composition on the debt due by him to me of L. 150, and discharged the same.	
The composition received, at 15s per L. 10,	L. 112 10 —
And the balance lost	37 10 —
	L. 150 — —

Here the whole debt of L. 150, due by James Willson, is cancelled, and he must therefore be stated as Cr. for that sum. Cash is Dr. for the sum received, by Rule II.; and Profit and Loss, or Loss by bad debts, for the rest, by Rule VI.

<i>Sundries Dr. to James Willson,</i>	
Cash, for compt. on L. 150,	
at 15s. per L.	L. 112 10 —
Profit and Loss, for balance lost	37 10 —
	L. 150 — —

Ex. 8.] Shipped for William Smith, per the Bonaventure, Forbes, from Leith to London

1000 yds linen, at 1s 2d	L. 58 6 8
600 lb leather, bought from J. Currier, at 1s	30 — —
Paid charges at shipping	13 4 —
	L. 89 — —

Here William Smith is Dr. for the amount of the cargo; he is debtor to Linen for the quantity delivered, as by Rule I. and to J. Currier for the leather delivered by him, by Rule VIII. and to Cash for the charges paid by us, by Rule I.

<i>William Smith Dr. to Sundries,</i>	
<i>To Linen, for 1000 yards,</i>	
at 1s 2d	L. 58 6 8
<i>To J. Currier, for 600 lb. leather, at 1s</i>	30 — —
<i>To Cash, for charges at shipping</i>	13 4 —
Shipped per the Bonaventure, Forbes, from Leith to London.	L. 89 — —

27. The learner may be assisted in understanding these and other complex posts, by resolving them into simple ones. Most of them might have been stated in that manner; and the complex form is only preferred, for abridging the ledger. In some articles, the different clauses are so connected, that they cannot be separated with propriety.

The narration is sometimes equally diffused through the post, after the Dr. and Cr. as in the five first examples. Sometimes the chief circumstances are narrated before the Drs. or Crs. be specified, as in Ex. 6.; sometimes after the first, as in Ex. 7.; and sometimes at the end, as in Ex. 8.

28. In some articles, there are both more Drs. and more Crs. than one. These may be entered in one journal-post, *Sundries Dr. to Sundries*, specifying first the Drs. and then the Crs. But, as this method is somewhat confused, we would recommend it, as a better way, to divide the transaction into two journal-posts; so that the first may contain only one Dr. and the second only one Cr.

Ex. Bartered with James Fotheringhal 100 pieces ofsnaburgs, at 12s	L. 60 — —
100 lb thread, at 3s 6d	17 10 —
	L. 77 10 —
For 10 hds lintseed, at 50s	L. 25 — —
500 yds linen, at 1s 6d	37 10 —
And received the balance in money	15 — —
	L. 77 10 —

<i>JOURNAL. Sundries Dr. to Sundries.</i>	
<i>Lintseed, for 10 hds at 50s</i>	L. 25 — —
<i>Linen, for 500 yds, at 1s 6d</i>	37 10 —
Received in barter from J. Fotheringhal	
Cash, for balance	15 — —
	L. 77 10 —

<i>To Osnaburgs, for 100 pieces, at 12s</i>	L. 60 — —
<i>To Thread, for 100 lb at 3s 6d</i>	17 10 —
Delivered him in barter	L. 77 10 —

Or rather,		
<i>Sundries Dr. to James Fotheringal.</i>		
<i>Lintfeed</i> , for 10 hds at 50 s	L. 25	—
<i>Linen</i> , for 500 yds, at 15 6d	37	10
Received in barter		
<i>Cash</i> , received balance	15	—
	L. 77	10
<i>James Fotheringal Dr. to Sundries.</i>		
<i>To Ofnaburgs</i> , for 100 pieces,		
at 12 s	L. 60	—
<i>To Thread</i> , for 100 lb at 3s 6d	17	10
Delivered in barter		
	L. 77	10

29. It is neither practicable nor necessary to enumerate all kinds of complex posts that may occur in business. We shall here only mention the entries which occur at opening the books.

The first journal-post contains the substance of the inventory. The entry is *Sundries Drs. to Stock*; the particular Drs. are Cash, the different kinds of goods and other property belonging to us, and the persons indebted to us.

The second journal-post contains the debts due by us. The entry is, *Stock Dr. to Sundries*; the particular Crs. are the persons to whom we are indebted.

The form of these entries is more fully exhibited at the beginning of the following sets.

30. The journal should be written by one person, in a fair hand, and at leisure hours. The articles are separated, and the titles and dates marked in the same manner as in the waste-book, § 3. The entries are written in half text, for ornament and distinction. In the inventory, the designation (or the business, station, and place of residence) of every person is mentioned; and the same is done the first time that any name occurs in journal-entry. At other times, it is sufficient to enter the name without the designation, unless we have dealings with two persons of the same name; in which case, it is always necessary to annex the designation, in order to distinguish them. The narration should be complete, without referring to the waste-book; and so clear, that every person, acquainted with the stile of the journal, may understand it with ease. When the post is written, we mark a dash / against the article, on the margin of the waste-book, to show how far the writing of the journal is advanced.

SECT. IV. OF POSTING AND BALANCING THE LEDGER.

31. The first thing to be done in the ledger, is to allot a proper space for each account. The accounts may be either opened in the same order that they occur in the journal; or accounts of the same kind may be placed together, the personal accounts on one part of the ledger, and the real accounts in another. The accounts of Stock, and Profit and Loss, are generally placed at the beginning. The room which each will require cannot be exactly known, but must be conjectured from the number of transactions that are likely to follow.

The number of the folio is marked in strong text at each corner of the top-line; and the titles of the accounts are written in fair text through both folios, if necessary. The designations of the personal accounts may be written on half text, or Italian hand; and some

write the titles in Saxon hand, for ornament. The word *Dr.* is prefixed to the title on the left-hand page; and *Contra Cr.* annexed to it on the right-hand page.

32. Next, An Index must be provided, for pointing out the folio's where the accounts are opened. The titles of the accounts are entered alphabetically in the index, and the number of the folio annexed. Personal accounts are entered by the first letter of the surname; companies, by the first letter of the surname of the first partner; and all other accounts, by the first letter of the first word. The most convenient kind of index is a long narrow book, of 24 leaves, one for each letter of the alphabet. A is marked on the top of the first leaf, and the paper pared away below it; B is marked on the second leaf, under A; and the other letters on the following leaves, in the same manner; by means of which we can turn at once to any letter required.

33. In posting the ledger, proceed by the following directions. First, look for the *Dr.* of the journal-post in the index, under the proper letter, and this directs you to the folio of the ledger where the account is, if it be already opened: if not, you must allot a space for it, write the title, and enter it in the index. Then enter the article on the left-hand page of the account under the title, or the former article, by writing the date on the margin, and the name of the creditor on the line, with the word *To* prefixed, and a short narration of the transaction annexed, and inserting the sum in the money-column, and the quantity, if it be an account of goods, in the inner column. Then turn to the account of the Cr. of the journal-post, and enter the article in the right-hand page, prefixing the word *By* to the name of the *Dr.*

34. This being done, turn to the journal, and mark on the margin the number of the folio's to which the article is posted. The figures which point out the reference to the *Dr.* and *Cr.* folio's should be separated by a line: for example, if the *Dr.* entry be on the third folio, and the *Cr.* entry on the fifth, the reference is marked $\frac{3}{5}$. These figures show how far the posting is advanced, and are useful in comparing the books.

The figures for dates or references should be written in a lighter hand than the figures in the columns for money or quantity.

35. There is often a reference-column ruled in the ledger, for pointing out the other entry, corresponding to any article. In this column, the folio of the *Cr.* entry is marked against the *Dr.* article, and the folio of the *Dr.* entry against the *Cr.* article.

Sometimes the accounts are numbered according to their order in the ledger; and the references, both in the journal and ledger, point out the number of the account instead of the folio.

36. In complex posts, turn to the several Drs. or Crs. in their order, and enter the articles according to the foregoing directions; placing the sums belonging to each in the money-column, against the respective entries.

37. An article in the ledger is generally comprehended in one line. The narration should be as full as can be contained in that bounds. If it cannot be narrated completely, the journal is referred to for further particulars, by writing *per Journal*, (or *p. J.*), either after an incomplete narration, or immediately after the *Dr.* or *Cr.* when there is no room for a proper narration.

tion. In complex posts, there can seldom be any narration annexed to the single Dr. or the single Cr. The entry is generally *To Sundries per J. or, By Sundries per J.* If the sense of the whole article can be narrated, it should be done; but it is improper to narrate the first or any other part of the article, and omit the others.

38. When the space allotted for an account in the ledger is filled up, the account must be transported to another folio. For this purpose, add the columns on both sides, and write against the sum, *Transported to folio* , inserting the number of the folio where the new account is opened, in the reference-column, or on the line, if no reference-column be used. Then, after titling the new account, and entering the number of the folio in the index, write on the Dr. *To amount, brought from folio* , inserting the number of the folio where the old account was; and on the Cr. *By amount brought from folio* ; and place the sums, and quantities, if any, in the proper columns.

When either side of an account is full, both sides should be transported, and diagonal lines drawn, to fill up the vacant space of the side which requires it.

39. The books should be written up as frequently as can be done conveniently; so that the journal may keep pace nearly with the waste-book, and the ledger with the journal. Each book should be carefully revised, and compared with the book from which it is posted. In comparing the ledger, observe the following directions:

Begin with the first journal-post, and turn to the folio of the ledger where the Dr. is entered, which you are directed to by the marginal reference, and compare the date, entry, and sum. If you find them to correspond, it is well; if not, the ledger must be altered, till it correspond with the journal. Then place a dot before the reference-figure in the journal, and a mark A before the sum in the ledger.

Proceed in the same manner to compare the Cr. of the journal-post, and all the following posts in their order. The dots in the journal show how far the comparison is advanced, and the marks in the ledger show what articles are compared.

The sums of accounts transported should be left blank till the books be compared; as an error in any article will occasion an alteration in the sum.

40. Some accountants correct all errors in the ledger, without erasing any thing, by the following methods: 1st, If the sum be entered too small, they make a second entry for the deficiency. 2d, If it be entered too large, they make an entry on the opposite side for the excess. 3d, If it be entered on the wrong side of the account, they enter it twice on the other; once, to counterbalance the error, and a second time for the true entry. 4th, If it be entered on a wrong account, they charge the wrong account Dr. to, or Cr. by, the right one.

41. We do not much approve of these methods, as they give the books a confused appearance; and would rather recommend the following rules: 1st, If an article be omitted, do not attempt to interline at the place where it should have been; but insert it under the last article when you discover the omission, and mark a cross X against it on the margin, and another at the place where it should have been. 2d, If you discover

a mistake immediately when committed, correct it without cancelling any thing, as in this example. *To Cash, say, To James Speirs received to account.* 3d, If you have written a line entirely wrong, or in a wrong place, write the word *Error* at the end, prefix a cross, and omit or cancel the sum. 4th, Cancel errors, by drawing a line lightly through them, so that the old writing may still be legible; by which it will be evident, that the book has not been vitiated for a fraudulent purpose. The same method should be followed in correcting errors in the journal.

42. When the comparison of the books is finished, glance over the ledger, to observe if the mark of comparison be affixed to every article. If not, you must turn to the journal, and observe if the articles be right which had not been marked.

43. Because the whole sum of the Dr. side of the ledger should be equal to the whole sum of the Cr. § 14. it is proper to try if they correspond. For this purpose, you may add the Dr. of every account, except such as are already balanced, placing the sums in an inner column, and extending them at the end of one or more folios, as you find most convenient, to the outer column; and, as you go along, add the Cr. in the same manner. If the sum total of both sides be equal, it gives a presumption that the books are right; if they differ, there is certainly some mistake. This is called the *Trial-balance*. The labour bestowed upon it is not lost, as the sums may be reserved for assisting us to collect the balances; the method of which will be explained afterwards.

44. If the sums of the trial-balance do not correspond, the books must be examined again. For this purpose, begin with the first article on the Dr. side of the first account, and turn to the account where the corresponding entry is, which you will find by the figure in the reference-column. If the articles agree, mark them with a dot. Proceed in like manner with the other articles on the Dr. of the first account; then with the articles on the Cr. of the same; and then with the following accounts in their order, till the error or errors be discovered. In complex entries, observe if the amount of the sums on one side be equal to the sum on the other. When you come to a dotted article, you may pass it by, because it has been examined already.

If the errors be not discovered at the first revival, you must repeat the same operation again, till you bring the books to balance. Marks different from the former ones, or differently placed, may be used, to signify that an article has been examined a second or a third time. As the detection of errors is the most tedious and disagreeable part of book-keeping, the accountant will be induced to guard against them with all possible care, when he has once experienced the trouble which they occasion.

45. Before we explain the method of balancing the books, it will be proper to direct the learner how to balance particular accounts. When we settle accounts with any person, and ascertain how much is owing at either hand, it is necessary to balance his account in the ledger, and open a new one, beginning with the sum that was due according to the settlement; and when we clear accounts again, we must go back to that article, and no farther.

If any articles be charged on either side, at the time
of

of settling, they must be immediately entered on the waste-book; from which they will pass in course to the journal and ledger; and a remark must be entered in the waste-book, that the account was settled, and the balance transferred to the proper side of the new account. This remark is transcribed in the journal; and the ledger account is balanced, when it occurs, in the course of posting.

If the balance be due to you, write on the Cr. *By balance due by him to Dr. new account*, and insert the sum due you; after which, the amount of both sides will be equal. Add the account, placing the sums opposite to each other; and, if the sides be unequal, draw a diagonal line through the vacant space of the shorter side, and close the old account by drawing lines under the sums. Then open the new account immediately under the old one, or in a new folio if the old one be full, by writing on the Dr. *To balance of former account due by him*. If the balance be due by you to him, the entries are made on the opposite sides, with the necessary alterations. When the new account is opened in the same folio, it is unnecessary to repeat the title; but the year and month, as well as the day, are repeated at the date of the first article.

46. Sometimes when an account is balanced, one or more articles are left out on purpose: For example, goods lately bought on credit may be left out, and the settlement may only relate to articles of longer standing. When this is the case, if the articles omitted be on the Dr. of the ledger, we write on the Cr. thus, *By articles sold him since 1st January replaced*: and when we have balanced the account, and opened a new one, we write on the Dr. *To articles replaced at settling, furnished since 1st January*: or, if the articles were left out for any other reason, we explain the same in the narration. If the omitted articles be on the Cr. the like entries are made on the opposite sides. It should be noticed in the waste-book and journal when this operation is necessary.

47. When we post any common article from the journal, we enter the sum on the Dr. of one account, and on the Cr. of another: when we balance an account, we place the balance sum on the Dr. of the old account, and on the Cr. of the new one, or contrarywise: and when we replace an article, as above directed, to the Dr. or Cr. of the old account, we place it after balancing to the Cr. or Dr. of the new one. Thus, in these entries, as well as in common posts, there are like sums entered on the Dr. and Cr. of the ledger, and the general equality of the sides is still preserved.

48. Merchants generally balance their books once a year. The design of this operation is, to collect the various branches of their business, diffused through the books, into a concise abstract; to ascertain their gain or loss since the last balance; and exhibit the present state of their funds. If the business be of such a kind, that most of the branches naturally come to an issue at a certain time of year, that time is the proper one for making the balance. Otherwise the end of the year, or the least busy time, may be chosen.

49. It is proper, before balancing, to settle as many personal accounts as possible; to clear all arrears and small charges; to take an exact inventory of the goods on hand, as far as can be done; and affix a moderate value to each article, according to the current prices at

the time; such a value as you would be willing at present to buy for. It is more proper to value the goods on hand in conformity to the current prices, than at prime cost: for the design of affixing any value is to point out the gain or loss, and the gain is in reality obtained, so soon as the prices rise, or the loss suffered so soon as they fall; therefore it is impossible to make up a just state of the affairs, unless the present prices be attended to.

50. These things being done, proceed to make the balance as follows: Prepare two sheets of paper, ruled with money-columns, in the form of Dr. and Cr.; write *Profit and Loss* as the title of the first, and *Balance* as the title of the second.

Prepare also some paper for computing the balances, and mark down the folios, titles, and sums of each account in the ledger, in a regular order. If a trial-balance was made, the sums may be transcribed from it. Pass by such accounts as are already closed; also the accounts of Stock and Profit and Loss, which are always the last of being balanced. Then subtract the lesser sum from the greater, and enter the difference on either of the sheets that the nature of the article points out, and on the side of that sheet which corresponds to the greater sum of the account. More particularly,

In personal accounts, enter the difference, which is the debt owing to you, or by you, on the proper side of the balance-sheet.

In the cash-account, enter the difference, which is the money in hand, on the Dr. side of the balance-sheet.

In accounts of goods or other property, if there be nothing remaining on hand, enter the difference, which is the gain or loss, on the proper side of the profit and loss sheet.

If the whole be still on hand, enter the present value on the Dr. of the balance-sheet; and, if this be different from the prime cost, charges included, enter the difference in the proper side of the profit and loss sheet.

If part be sold, and part on hand, place the value of the quantity on hand under the sum of the Cr. and add them. The sum is the whole return that will be obtained, if the rest of the goods be sold at the estimated value; and this, being compared with the sum of the Dr. which is the whole expense, shows the gain or loss. Enter the same in the proper side of the profit and loss sheet, and enter the quantity and value on hand on the Dr. of the balance-sheet.

Observe if the quantities in the inner columns be equal on both sides, when the goods are all sold; or, if the difference, when only part is sold, be equal to the quantity in hand. If they correspond, you have a just account of the goods. If the Dr. be greater, there is something amissing, which you must enter on the Dr. of the balance-sheet, and mark the cause of the deficiency, as inlake, waste, or the like. If the Cr. be greater, there is an excess, which you must enter on the Cr. of the balance-sheet, together with the occasion of it, as difference of measure, or the like.

In accounts subsidiary to profit and loss, enter the difference on the proper side of the profit and loss sheet.

When there is nothing written on one side of an account, enter the sum of the article or articles on that sheet which the kind of the account points out.

51. When you have collected all the balances, sum up both sheets, and add to the profit and loss sheet the

sums of the profit and loss account in the ledger: then subtract the lesser sum of each sheet from the greater.

This being done, mark the sums of the stock-account on your computation-paper, and add thereto the balance of the profit and loss sheet, on the side which corresponds with the greater sum of that account: then subtract the lesser sum from the greater. The remainder will be equal to the difference of the sides of the balance-sheet, if the books be right, and the balances exactly collected.

52. We shall prove that this equality must always hold, from the nature of the articles collected. The Dr. of the balance-sheet contains every kind of property belonging to you, and every debt owing to you; and the Cr. contains every debt owing by you: therefore the difference of the sides shows what your nett estate amounts to. The profit and loss sheet, when the articles from the ledger are included, contains every thing you have gained on the Cr. and every thing you have lost on the Dr.; and the difference of the sides is your nett gain or loss. The stock-account contained your effects and debts at the time the books were opened; and therefore, when the gain or loss is added to the proper side, it must show the extent of your nett estate at present. Thus the stock-account and the balance-sheet both point out how much you are worth at present; the one from your former stock, allowance being made for your gains or losses; the other from a view of your present effects and debts; and they will correspond, because both must be agreeable to the truth, if the books be correct.

53. Though the books must balance, if free from error, yet it is sometimes difficult to adjust them exactly, especially when the business is extensive, and the error trifling. If there be still a difference, which we do not think it worth while to make further search for, we may close the books, by making Profit and Loss Dr. or Cr. for the same. This introduces an article on one side of the ledger, which has none corresponding to it on the other, but is balanced by some undiscovered error.

54. The balance being struck, your next work is to close the books. Every article in the ledger should be posted from the journal; therefore, the most regular way of finishing both is by inserting the following articles in the journal, and posting them in the common manner to the ledger.

1st, *Profit and Loss Dr. to Sundries, for loss, on the following accounts.* The particulars are taken from the Dr. of the Profit and Loss sheet.

2d, *Sundries Dr. to Profit and loss, for gain, on the following accounts.* The particulars are taken from the Cr. of the Profit and Loss sheet.

3d, *Balance-account Dr. to Sundries, for debts and property belonging to me.*

4th, *Sundries Dr. to Balance-account, for debts due by me.* The particulars of this and the former are taken

from the respective sides of the balance-sheet.

5th, *Profit and Loss Dr. to Stock for nett gain; or Stock Dr. to Profit and loss, for nett loss.*

6th, *Balance-account Dr. to Stock, for nett stock.*

55. When the four first of these articles are posted in the ledger, all the personal, real, and subsidiary accounts will balance, and you may add them as you go along. In accounts of goods, if there be any deficiency, you must enter it on the Cr. in the inner column; and, if there be any outcome, you must enter it on the Dr. before you add the account. Then the sums of every account and every column on the opposite sides will be equal.

The only accounts that remain open are, *Profit and Loss, Stock, and Balance.* The fifth post balances the profit and loss account, and the sixth balances the stock-account. It was noticed, § 14. that the whole sums of Dr. and Cr. of the ledger are equal; and therefore, if the sides of every account, except one, be balanced, that one will balance of its own accord. The balance-account alone remains open, and, upon trial, you will find that the sides are equal. This affords an additional proof, or, at least, a different view, of what was demonstrated, with respect to the balance of the books, in § 52.

The lines above and under the sums, at a general balance, may be drawn with red ink; and, at the balancing of particular accounts, with black ink, for distinction.

56. Some chuse to insert the particulars of the profit and loss and balance sheets in the respective accounts of the ledger. If this be done, it is unnecessary to enumerate them also in the journal.—Some chuse to balance the accounts of goods, whenever the quantity is sold off; and we approve of this method, as it lessens the work at the general balance, which is always sufficiently laborious.

57. Thus is the state of a person's affairs brought together, in a short compass, under his view; and the articles of the balance-sheet supply materials for a new inventory. It is convenient, however, to alter the order, and arrange the real accounts together, and the personal ones together.

58. It is not necessary to begin new books, nor open the accounts anew, unless the old folios be full. The accounts may be continued in the former folios; but it is best to begin a new ledger, if the old one be not likely to hold all the business of the next year. When one comes to have several sets of books, it is common to distinguish them by the letters of the alphabet. The first waste-book, journal, and ledger, are marked A, the second, B; and so on.

In the following specimen, the waste-book and journal are placed on opposite pages, that the learner may easily compare them; and the rules are referred to by their numbers.

(1) WASTE-BOOK.

JOURNAL.

(1)

Edinburgh, JANUARY 1. 1774.

Edinburgh, JANUARY 1. 1774.

INVENTORY of ready money, goods, and debts,
belonging to James Oiwald merchant in Edinburgh.

Ready money	L 75 10	—
200 bolls meal, at 13 s	L 130	—
6 hds. Port wine, at L 15	90	—
70 reams paper, at 10 s 6 d	36 15	—
120 sp. five hank yarn, at 2 s 3 d	13 10	—
	270	5
A house in Lawn-market Edin. value	300	—
James Boswell merch. Edin. owes per account	L 73 4	—
Thomas Pirie writer Edin. owes per d°	12 3 8	—
Henry Hardy merch. Glas- gow per bill	75	—
David Miller manufacturer Haddington per receipt	18	—
	178	7 8
§ 29		824 2 8

LIST of debts by the said James Oiwald.

To the Royal Bank per account	L 230	—
To Tho. Smith merchant London per d°	54	—
To Will. Nisbet carpenter Leith per d°	28 7 3	—

§ 29

Bought for ready money 105 yards calicoe, at 3 s 2 d
Rule III.

Sold James Cuthbert merchant Leith 50 bolls meal,
at 13 s 3 d

Rule I.

Bartered 60 spindles five hank yarn, at 2 s 4 d, for 80
yards diaper, at 1 s 9 d

Rule III.

Paid William Nisbet in full
Rule I.

Bought from Will. Bruce merchant
Leith, 200 bushels falt, at 1 s 8 d L 16 13 4
320 stone iron, at 3 s 4 d 53 6 8

Rule II.

Sold 30 rms paper to Ja. Boswell, at 12 s L 18 —
12 to John Henderson stationer
Edinburgh, at 12 s 7 4 —
5 for ready money, at 11 s 2 15 —

47 Rules I. III.

Sold Will. Hunter merchant Dunbar
150 bush. falt, at 1 s 9 d, L 13 : 2 : 6
Received in part L 10 — —
And he owes the balance 3 2 6

Rules I. III.

Sundries Dr. to Stock for articles belonging to James
Oiwald merchant Edinburgh.

1 Cash on hand	L 75 10	—
1 Meal. For 200 bolls, at 13 s	L 130	—
1 Port-wine. For 6 hds. at L 15	90	—
2 Paper. For 70 rms, at 10 s 6 d	36 15	—
2 Yarn. For 120 sp. five hank, at 2 s 3 d	13 10	—
	270	5
2 House in Lawn-market Edin. value	300	—
2 Ja. Boswell mer. Ed. per acc. L 73 4	—	—
2 Tho. Pirie writer Ed. per d° 12 3 8	—	—
2 Henry Hardy merchant Glas- gow per bill	75	—
2 David Miller manufacturer	—	—
1 Haddington, per receipt 18	—	—
	178	7 8

824 2 8

Stock Dr. to Sundries.

2 To Royal Bank per account	L 230	—
3 To Tho. Smith merch. London per acc.	54	—
3 To Will. Nisbet carpenter Leith per d°	28 7 5	—

312 7 3

3 Calicoe Dr. to Cash. Bought 105 yards, at 3 s 2 d

3 James Cuthbert merchant Leith, Dr. to Meal, sold
50 bolls, at 13 s 3 d

33 2 6

3 Diaper Dr to Yarn. Delivered 60 sp. five hank in
barter for 80 yards, at 1 s 9 d

7 —

3 William Nisbet Dr. to Cash. Paid him in full

28 7 3

Sundries Drs. to William Bruce merchant Leith
3 Salt. For 200 bushels, at 1 s 8 d L 16 13 4
3 Iron. For 320 stones, at 3 s 4 d 53 6 8

70 —

Sundries Drs to Paper.

2 James Boswell, for 30 rms, at 12 s	L 18	—
4 John Henderson stationer Edinburgh, for 12	12 s 7 4	—
1 Cash. For 5	11 s 2 15	—

27 19 —

Sundries Drs to Salt, for 150 bush. at 1 s 9 d, L 13 2 6

1 Cash. Received in part	L 10	—
4 William Hunter merchant Dunbar, for balance due by him	3 2 6	—

13 2 6

(2)

WASTE-BOOK.

Edinburgh, JANUARY 22. 1774.

Received from Henry Hardy in payment of his bill	L 75 —	
And for interest on do	2 10	77 10
Rules II. VII.		
Paid the Royal Bank	-	100
Rule I.		
26.		
Bought from Alex. Sharp merch. Dundee 500 fp. four hank yarn, at 1s 11d	L 47 18 4	
Paid him in part	L 15 —	
And the balance due him is	32 18 4	47 18 4
Rules II. III.		
30.		
Received 150 bolls meal, 13s 2d L 98 : 15s, in barter for 6 hds. Port wine, at L 16	L 96 —	
Paid the balance	2 15	98 15

Rule III.

Edinburgh, 1st FEBRUARY, 1774.

Sold James Boswell		
48 buh. falt. being the rem. at 1s. 8½d.	L 4 2 —	
60 fp. five hank yarn, at 2s 3½d	6 17 6	
100 stone iron, at 3s 4½d	16 17 6	27 17
Rule I.		
3.		
Received from James Cuthbert in part		30
Rule II.		
10.		
Bartered 22 reams paper, at 12s	L 13 4 —	
30 bolls meal, at 13s 6d	20 5	
	L 33 9	
For 334½ fp. four hank yarn, at 2s		33 9
Rule III.		
Taken for the use of my shop the remaining ream paper, value		10 6

Rule VI.

15.		
Received from William Hunter in full	L 3 2 6	
from James Boswell in part	70 —	73 2 6
Rule II.		
Paid the Royal Bank	-	100
Rule I.		
19.		
Bartered 100 yards calicoes, at 3s 6d,	L 17 : 10s	
For one hhd. Port-wine	L 14 10 —	
Received the balance	3 —	17 10

Rule III.

JOURNAL.

(2)

Edinburgh, JANUARY 22. 1774.

1.	Cash Dr. to Sundries.	
2.	To Henry Hardie. Rec. paym. of his bill	L 75 —
1.	To Profit and Loss. Rec. interest on do	2 10
		77 10
2.	Royal Bank Dr. to Cash. Paid them	-
2.		100
	26.	
2.	Yarn Dr. to Sundries, for 500 spindles four hank, at 1s 11d	L 47 18 4
1.	To Cash. Paid in part	L 15 —
4.	To Alex. Sharp merch. Dundee for bal.	32 18 4
		47 18 4
	30.	
1.	Meal Dr. to Supd. for 150 bolls, at 13s 2d	L 98 : 15s
1.	To Port-Wine. For 6 hds. delivered in barter, L 16,	L 96 —
1.	To Cash. Paid balance	2 15
		98 15

Edinburgh, 1st FEBRUARY, 1774.

2.	James Boswell Dr. to Sundries.	
3.	To Salt, for 48 buh. being the rem.	
2.	at 1s 8½d	L 4 2 —
3.	To Yarn, for 60 fp. five hank, at 2s 3½d	6 17 6
3.	To Iron, for 100 stones, at 3s 4½d	16 17 6
		27 17
	3.	
1.	Cash Dr. to James Cuthbert. Received in part	
3.		30
	10.	
2.	Yarn Dr. to Sundries. For 334½ fp. four hank yarn, at 2s, L 33 : 9s	
2.	To Paper. For 22 reams delivered in barter, at 12s	L 13 4 —
1.	To meal. For 30 bolls, at 13s 6d	20 5
		33 9
4.	Charges Merchandize Dr. to Paper, taken for the use of shop, 1 ream, value	-
2.		10 6
	15.	
1.	Cash Dr. to Sundries.	
4.	To William Hunter. Received in full	L 3 2 6
2.	To James Boswell. ——— in part	70 —
		73 2 6
2.	Royal Bank Dr. to Cash. Paid them	-
1.		100
	19.	
	Sundries Dr. to Calicoes. For 100 yards delivered in barter, at 3s 6d, L 17 : 10s.	
1.	Port Wine. For 1 hhd.	L 14 10 —
1.	Cash. Received balance	3 —
3.		17 10

Edinburgh,

(3) WASTE-BOOK.

JOURNAL.

(3)

Edinburgh, 19th FEBRUARY, 1774.

Edinburgh, 19th FEBRUARY, 1774.

Sold 30 bolls meal for ready money,
at 13s 8d L 20 10 —
45 to Henry Hardy, at 13s od 31 2 6
27 to William Hunter, at 13s 10d 18 13 6
52 to Baillie and Bell, Borrow-
townnefs, at 13s 10d 35 19 4

Sundries Drs. to Meal.
1. *Cash.* For 30 bolls, 13s 8d L 20 10 —
2. *Henry Hardy.* For 45 13s 10d 31 2 6
4. *William Hunter.* For 27 13s 10d 18 13 6
4. *Baillie and Bell, Bor-*
1. *rowtownnefs.* For 52 13s 10d 35 19 4

154 Rules I. III.

154

Drawn on the Royal Bank
Rule II.

1. *Cash Dr. to Royal Bank.* Drawn on them

Paid William Bruce in part L 50 — —
Alexander Sharp in full 32 18 4
And Tho. Smith's bill on me at fight 35 — —

Sundries Dr. to Cash.
3. *William Bruce.* Paid him in part L 50 — —
4. *Alex. Sharp.* Paid him in full 32 18 4
3. *Tho. Smith.* Paid his bill on me at fight 35 — —

Rule I.

Edinburgh, 1st MARCH, 1774.

Paid charges and cellar-rent of salt L 1 2 6
Charges and loft-rent of meal 3 3 —

Sundries Drs. to Cash.
3. *Salt.* Paid charges and cellar-rent L 1 2 6
1. *Meal.* Paid charges and loft-rent 3 3 —

Rule IV.

Sundries Drs. to Thomas Pirie.

Received from Thomas Pirie in full L 12 — —
Discounted him — 3 8

1. *Cash.* Received in full L 12 — —
1. *Profit and Loss.* Discounted him — 3 8

Rules II. VI.

James Dalton, Manchester, Dr. to Yarn.

Sold James Dalton, Manchester
60 spindles four hank yarn, at 2s 1d L 6 1 3
300 do do at 1s 11 1d 29 13 9

4. For 60 sp. four hank, at 2s 1d L 6 1 3
2. And 300 do. at 1s 11 1d 29 13 9

360 Rule I.

360

Received from Jan Jonkheer Rotterdam 6 bags clo-
ver feed, qt. 200 lb. each, amount per invoice
f 312, at 22d per f. L 28 12 —
Paid freight and charges 1 5 —

4. *Clover-feed Dr. to Sundries.*
4. *To Jan Jonkheer,* for 6 bags, qt. 200 lb. each,
is 1200 lb. amount per invoice, f. 312, at
22d L 28 12 —
1. *To Cash.* Paid freight and charges 1 5 —

Rules II. IV.

Sundries Drs. to Clover-feed. For 2 bags, at
L 6, L 12 — —

Bartered with James Boswell 2 bags clover seed, at
L 6, L 12, for 2 hds. lintf. at 55s L 5 10 —
Received in money 5 — —
And he owes the balance 1 10 —

4. *Lint-feed.* For 2 hds. reed. in bart. 55s 5 10 —
1. *Cash.* In part 5 — —
4. *James Boswell,* for balance 1 10 —

Rules III. I.

Sundries Drs. to Cash.

Paid Tho. Smith in full L 19 — —
And for interest 1 10 —

3. *Thomas Smith.* Paid him in full L 19 — —
1. *Profit and Loss.* Paid him interest 1 10 —

Rules I. IV.

Sundries Drs. to Clover-feed.

Sold 140 lb. clover-feed to John Scott farmer at
Haugh-head, at 7 1d L 4 7 6
70 to James Cuthbert, at 7 1d 2 3 9
120 for ready money, at 7 1d 3 12 6

5. *John Scott,* farmer at Haugh-head, for
140 lb. at 7 1d L 4 7 6
3. *James Cuthbert,* for 70 7 1d 2 3 9
1. *Cash.* for 120 7 1d 3 12 6

330

Rules I. II.

330

Edinburgh, 24th MARCH, 1774.

✓ James Boswell has paid the Royal Bank on my acc'.
Rule VIII.

-25-

✓ Bought from William Ainslie merchant Alloa $\frac{7}{8}$ share
of the ship Hazard, for
Rule II.

-28-

✓ Sold Baillie and Bell,
150 stone Iron, at 3s 7d L 26 17 6
1 hd. Port-wine 15 5 —

Rule I.

Edinburgh, 2d APRIL, 1774.

✓ Sold for ready money
50 yards diaper, at 1s 11d L 4 15 10
30 bolls meal, at 13s 7d 20 7 6
1 hd. lint-feed 3 3 —
160 lb. clover-feed, at 7 $\frac{1}{2}$ d 5 3 4
30 stone iron, at 3s 6 $\frac{1}{2}$ d 5 6 3

Rule III.

✓ Drawn on the Royal Bank for
Rule II.

✓ Bought for ready money
30 casks train oil, at 22s L 33 —
30 bolls meal, at 13s L 19 10 —
40 do. at 13s 2d 26 6 8
70 45 16 8

Rule III.

✓ Sold Will. Ainslie 30 yds. diaper, at 2s L 3 —
And paid him 30 —

Rule I.

-8-

✓ Baillie and Bell have paid Will. Ainslie, at my de-
fire, balance of my share of the ship Hazard
Rule VIII.

-11-

✓ Sold James Boswell 20 casks train-oil, at 27s
Rule I.

-14-

✓ Sold George Gordon merch. Stirling
10 casks train-oil, at 28s L 14 —
1 hd. lint-feed 3 5 —
35 bolls meal, at 13s 8d 23 18 4

L 41 3 4

Received in part L 35 —
And he owes the balance 6 3 4

Rules I. II.

-16-

✓ Paid Baillie & Bell's bill on me to C. Cowan, at fight
Rule I.

Edinburgh, 24th MARCH, 1774.

✓ Royal Bank Dr. to James Boswell. Paid them by him

-25-

✓ Share of ship Hazard Dr. to William Ainslie merchant
Alloa, bought $\frac{7}{8}$ share for

-28-

✓ Baillie and Bell Dr. to Sundries.
To Iron. For 150 stone, at 3s 7d L 26 17 6
To Port wine. For 1 hd. 15 5 —

Edinburgh, 2d APRIL, 1774.

✓ Cash Dr. to Sundries.
To Diaper. For 50 yards, at 1s 11d L 4 15 10
To Meal. For 30 bolls, at 13s 7d 20 7 6
To Lint-feed. For 1 hd. 3 3 —
To Clover-feed. For 160 lb. at 7 $\frac{1}{2}$ d 5 3 4
To Iron. For 30 stone, at 3s 6 $\frac{1}{2}$ d 5 6 3

✓ Cash Dr. to Royal Bank. Drawn on them for

-5-

✓ Sundries Drs. to Cash.
Train-oil. For 30 casks, at 22s L 33 —
Meal. For 30 bolls, at 13s L 19 10 —
And 40 at 13s 2d 26 6 8
70 45 16 8

✓ William Ainslie Dr. to Sundries.
To Diaper. For 30 yards, at 2s L 3 —
To Cash. Paid him 30 —

✓ William Ainslie Dr. to Baillie and Bell. Paid him,
by them on my account, being balance of share
of ship Hazard

✓ James Boswell Dr. to Train-oil. Sold him 20 casks,
at 27s

✓ George Gordon Dr. to Sundries.
To Train-oil. For 10 casks, at 28s L 14 —
To Lint-feed. For 1 hd. 3 5 —
To Meal. For 35 bolls, at 13s 8d 23 18 4

✓ Cash Dr. to George Gordon. Received in part

✓ Baillie and Bell Dr. to Cash. Paid their bill on me
to C. Cowan, at fight

(5)

WASTE-BOOK.

Edinburgh, 18th APRIL, 1774.

✓ Taken for the use of my family, the remaining five yards calicoe, at 3 s 2 d			
Rule VI.			
22.			
✓ The Royal Bank have paid Jan Jonkheer's bill on me, 1 mdt. at my desire			
Rule VIII.			
25.			
✓ Received my proportion of profits on a voyage to Rotterdam by the Hazard			
Rule V.			
30.			
✓ Paid for small charges on my business since 1st January	L 5 3 8		
Personal and family expences	32 — —		
Rule VI.			
Due Thomas Sharp, my clerk, for wages			
Rule VI.			
Due the Royal Bank for interest			
Rule VI.			
Previous to the balancing of my books, I have taken an inventory of the goods in my shop and ware house,			
124 bolls meal, at 13 s 6 d	L 83 14 —		
474 sp. four hank yarn, at 2 s	47 8 —		
40 stone iron, at 3 s 4 d	6 13 4		
300 lb. clover-feed, at 6 d	7 10 —		
	L 145 5 4		
I value my house at	300 — —		
And my share of ship Hazard	140 — —		
	L 585 5 4		

JOURNAL.

Edinburgh, 18th APRIL, 1774.

✓ Proper expences Dr. to Calicoes. For 5 yards taken for family-use, at 3 s 2 d			
22.			
✓ Jan. Jonkheer Dr. to Royal Bank. For his bill on me 1 mdt, paid by them			
25.			
✓ Cash Dr. to Share of ship Hazard. Received my proportion of profits on a voyage to Rotterdam,			
30.			
Sundries Drs. to Cash.			
✓ Charges Merchandize. Paid small charges since Jan. 1.	L 5 3 8		
✓ Proper Exp. Paid perf. and family charges	32 — —		
Charges of Merchandize Dr. to Thomas Sharp, my clerk. Due him for wages			
Profit and Loss Dr. to Royal Bank. Due them for int.			
Profit and Loss Dr. to Sundries, for articles of loss.			
To Salt	L — 11 4		
To Charges Merchandize	13 14 2		
To Proper Expences	32 15 10		
See § 54			
Sundries Drs. to Profit and Loss, for articles of gain.			
✓ Meal	L 9 18 —		
✓ Port-wine	6 15 —		
✓ Paper	4 18 6		
✓ Yarn	2 3 2		
✓ Calicoes	1 13 4		
✓ Diaper	— 15 10		
✓ Iron	2 7 11		
✓ Clover-feed	5 — 1		
✓ Lint-feed	— 18 —		
✓ Share of ship Hazard	23 — —		
✓ Train-oil	8 — —		
✓ Bal Account Dr. to Sum. for articles belonging to me.			
To Cash	L 8 3 10		
To Meal. For 124 bolls, at 13 s 6 d	83 14 —		
To Yarn. For 474 sp. at 2 s	47 8 —		
Amiffing $\frac{1}{2}$ spindle.			
To House in Lawn-market	300 — —		
To James Boswell	37 11 —		
To Henry Hardy	31 2 6		
To David Miller	18 — —		
To James Cutbberth	5 6 3		
To Iron. For 40 stone, at 3 s 4 d	6 13 4		
To John Henderson	7 4 —		
To William Hunter	18 13 6		
To James Dalton.	35 15 —		
To Clover-feed. For 300 lb. at 6 d	7 10 —		
Inlake 10 lb.			
To John Scott	4 7 6		
To Share of ship Hazard	140 — —		
To George Gordon	6 3 4		

(6) JOURNAL.

Edinburgh, 30th APRIL, 1774.

Sundries Drs. to Balance-Account				
.1 Meal.	Outcome 3 bolls			
.2 Royal Bank	-	L 201	3	2
.3 William Bruce	-	20	-	-
.5 Thomas Sharp	-	8	-	-
			229	3 2
.1 Profit and Loss Dr.	to Stock for nett gain		16	13 8
.1 Stock Dr.	to Balance-Account, for nett flock		528	9 1

The next JOURNAL would begin thus.

Sundries Dr. to Stock.				
Cash on hand		L 8	3	10
Meal.	For 124 bolls, at 13s	L 83	14	-
Yarn.	For 474 sp. 4-hank, at 2s 47	8	-	-
Iron.	For 40 stone, at 3s 4 d	6	13	4
Glover-feed.	For 300 lb. at 6d	7	10	-
			145	5 4
House in Lawn-market Edinburgh,	value	L 300	-	-
Share in Ship Hazard.	For one third	140	-	-
			440	- -
James Boswell Edinburgh.				
Due by him		L 37	11	-
Henry Hardy Glasgow.	D ^o	31	2	6
David Miller-Haddington.	D ^o	18	-	-
James Cuthbert Leith.	D ^o	5	6	3
John Henderson Edin.	D ^o	7	4	-
William Hunter Dunbar.	D ^o	18	13	6
James Dalton Manchester.	D ^o	35	15	-
John Scott Haughhead.	D ^o	4	7	6
George Gordon Stirling.	D ^o	6	3	4
			164	3 1
			757	12 3
Stock Dr to Sundries.				
To Royal Bank.	Due them	L 201	3	2
To William Bruce Leith.	Due him	20	-	-
Thomas Sharp, my clerk.	D ^o	8	-	-
			229	3 2

Stock

(1)

LEGER.

For.

LEGER.

(1)

Dr.		Stock,			
1774	Jan. 1	To Sundries per J.	312	7	3
Apr. 30		To Balance-account, for nett stock	528	9	1
			840	16	4
Dr.		Profit and Loss,			
1774	Mar. 4	To Thomas Pirie, discounted him	2	3	8
Apr. 17		To Cash, paid Tho. Smith interest	1	1	10
30		To Royal Bank, for interest due them	2	2	11
		To Sundries, per J.	47	1	4
		To Stock, for nett gain	1	16	13
			67	19	10
Dr.		Cash,			
1774	Jan. 1	To Stock on hand	1	75	10
	15	To Paper, for 5 reams, at 11s	2	2	15
	18	To Salt, in part, per J.	3	10	—
Feb. 22		To Sundries for Hen. Hardy's bill, with int.	77	10	—
	3	To James Cuthbert, in part	3	73	2
	15	To Sundries, per J.	73	2	6
	19	To Calicoes, for bal. of 100 yards, per J.	3	3	—
	20	To Meal, for 30 bolls, at 13s 8d	1	20	10
	20	To Royal Bank, drawn on them	2	120	—
Mar. 4		To Thomas Pirie, in full	2	12	—
	17	To Clover-feed, in part, for 2 bags	4	5	—
	21	To Clover-feed, for 120 lb. at 7½d	4	3	12
Apr. 2		To Sundries, per J.	38	15	1
	5	To Royal Bank, drawn on them	2	60	—
	14	To George Gordon, in part	5	35	—
	25	To Share of Ship Hazard for share profits p. J.	5	33	—
			599	15	11
Dr.		Meal,	Bolls		
1774	Jan. 1	To Stock on hand, at 13s	200	130	—
	30	To Sundries, per J. at 13s 2d	150	98	15
Mar. 1		To Cash, paid charges and loft-rent	—	3	3
Apr. 5		To Cash, per J.	70	45	16
30		To Profit and Loss, for gain	—	9	18
		Outcome	3	—	—
			423	287	12
Dr.		Port-wine,	Hds		
1774	Jan. 1	To Stock on hand, at L 15	6	1	90
	19	To Calicoes, in barter	13	14	10
Apr. 30		To Profit and Loss, for gain	1	6	15
			7	111	5

Contra		Cr.			
1774	Jan. 1	By Sundries, per J.	824	2	8
Apr. 30		By Profit and Loss, for nett gain	1	16	13
			840	16	4
Contra		Cr.			
1774	Jan. 22	By Cash, received int. on Hen. Hardy's bill	2	10	—
Apr. 30		By Sundries, per J.	65	6	10
			67	19	10
Contra		Cr.			
1774	Jan. 3	By Calicoes, for 105 yards, at 3s 2d	3	16	12
	10	By William Nisbet, in full	3	28	7
	22	By Royal Bank, paid them	2	100	—
	26	By Yarn, in part, for 500 sp. four hank	2	15	—
	30	By Meal, paid balance of 150 bolls	1	2	15
Feb. 15		By Royal Bank, paid them	2	100	—
	21	By Sundries, per J.	1	17	18
Mar. 1		By Sundries, per J.	4	5	6
	12	By Clover-feed, paid freight and charges	1	5	—
	17	By Sundries, paid Tho. Smith, with int. per J.	2	10	—
Apr. 5		By Sundries, per J.	78	16	8
		By William Ainslie, paid him	3	0	—
	16	By Bailie and Bell, paid their bill on me ft.	4	38	2
	30	By Sundries, for charges and expences per J.	3	7	8
		By Balance-account	8	3	10
			599	15	11
Contra		Cr.	Bolls		
1774	Jan. 3	By James Cuthbert, at 13s 3d	50	33	4
	10	By Yarn in barter, at 13s 6d	30	20	5
	19	By Sundries, per J.	154	100	5
Apr. 2		By Cash, at 13s 7d	30	1	6
	14	By George Gordon, at 13s 8d	35	5	23
	30	By Balance-account, at 13s 4d	124	5	83
			423	287	12
Contra		Cr.	Hds		
1774	Jan. 10	By Meal, in barter, at L 16	6	1	96
Mar. 28		By Bailie and Bell	14	15	5
			7	111	5

(2)

LEGER.

Dr.

LEGER.

Cr. (2)

Dr. Paper,				Contra			
		R.	Dr.			Cr.	Cr.
1774 Jan. 1	To Stock on hand, at 10s 6d	70	36 15	1774 Jan. 15	By Sundries, per J.	47	27 19
Apr. 30	To Profit and Loss, for gain	70	4 18 6	Feb. 10	By Yarn in barter, at 12s	22 2	13 4
					By Charges Merchandize, for shop-use	14	10 6
						70	4 13 6
Dr. Yarn,				Contra			
		Spindles	Dr.			Spindles	Cr.
		4 H 5 H				4 H 5 H	
1774 Jan. 1	To Stock on hand, at 2s 3d	120	1 13 10	1774 Jan. 5	By Diaper, at 2s 4d	60	3 7
26	To Sundries, per J. at 1s 11d	500	47 18 4	Feb. 1	By James Boswell, at 2s 3½d	60	17 6
Feb. 10	To Sundries, per J. at 2s	334½	33 9	Mar. 5	By James Dalton per J.	360	4 35 15
Apr. 30	To Profit and Loss, for gain		1 2 3 2	Apr. 30	By Balance-account, at 2s Amiffing	474	5 47 8
						834½	120 97 6
Dr. House in Lawn-market,				Contra			
						Cr.	
1774 Jan. 1	To Stock, for value		1 300	1774 Apr. 30	By Balance-account	5	300
Dr. Jas. Boswell merchant Edinburgh,				Contra			
						Cr.	
1774 Jan. 1	To Stock due by him per account	1	73 4	1774 Feb. 15	By Cash in part	1	70
15	To paper, for 30 reams, at 12s	2	18	Mar. 24	By Royal Bank, paid in by him	2	40
Feb. 1	To Sundries per J.	2	17	Apr. 30	By Balance-account	5	37 11
Mar. 17	To Clover-feed, for bal. of 2 bags, per J.	4	1 10				
Apr. 11	To Train-oil, for 20 casks, at 27s	5	27				
			147 11				147 11
Dr. Thomas Pirie writer Edinburgh,				Contra			
						Cr.	
1774 Jan. 1	To Stock due by him per account	1	12 3 8	1774 Mar. 4	By Sundries in full, with discount, per J.		12 3 8
Dr. Henry Hardy merchant Glasgow,				Contra			
						Cr.	
1774 Jan. 1	To Stock due by him per bill	1	75	1774 Jan. 22	By Cash in full	1	75
Feb. 10	To Meal, for 45 bolls, at 13s 10d	1	31 2 6	Apr. 30	By Balance-account	5	31 2 6
Dr. David Miller manufacturer Haddington,				Contra			
						Cr.	
1774 Jan. 1	To Stock due by him, per receipt	1	18	1774 Apr. 30	By Balance-account	5	18
Dr. Royal Bank of Scotland,				Contra			
						Cr.	
1774 Jan. 22	To Cash, paid them	1	100	1774 Jan. 1	By Stock, due them per account	1	230
Feb. 15	To Cash, paid them	1	100	Feb. 22	By Cash, drawn on them	1	120
Mar. 24	To Jas. Boswell, paid them by him	2	40	Apr. 5	By Cash, drawn on them	1	60
Apr. 30	To Balance-account	5	201 3 2	22	By J. Jonkheer, for his bill paid them p. J.	4	28 12
				30	By Profit and Loss, for interest due them	1	2 11 2
			44 3 2				44 3 2

Dr.

(3) L E G E R.

L E G E R.

(3)

Dr.	Tho. Smith merchant London,				
1774					
Feb. 22	To Cash, paid his bill on me at sight	1	35		
Mar. 17	To Cash, in full	1	19		
			54		
Dr.	Will. Nisbet carpenter Leith,				
1774					
Jan. 10	To Cash, paid him in full	1	28	7	3
Dr.	Calicoes,				
1774					
Jan. 3	To Cash, at 3s 2d	105	16	12	6
Apr. 30	To Profit and Loss, for gain	1	1	13	4
			105	18	5 10
Dr.	Ja. Cuthbert merchant Leith,				
1774					
Jan. 3	To Meal, for 50 bolls, at 13s 3d	1	33	2	6
Mar. 21	To Clover-feed, for 70 lb. at 7½d	4	2	3	9
			35	6	3
Dr.	Diaper,				
1774					
Jan. 5	To Yarn in barter, at 1s 9d	80	2	7	15 10
Apr. 30	To Profit and Loss, for gain	1			
			80	7	15 10
Dr.	Salt,				
1774					
Jan. 13	To William Bruce, at 1s 8d	200	3	16	13 4
Mar. 1	To Cash, paid charges and cellar-rent	1	1	2	6
			200	17	15 10
Dr.	William Bruce merchant Leith,				
1774					
Feb. 22	To Cash in part	1	50		
Apr. 30	To Balance account	5	20		
			70		
Dr.	Iron,				
1774					
Jan. 13	To William Bruce, at 3s 4d	320	3	53	6 8
Apr. 30	To Profit and Loss, for gain	1	2	7	11
			320	55	14 7

Contra	Cr.				
1774					
Jan. 1	By Stock, due him per account	1	54		
			54		
Contra	Cr.				
1774					
Jan. 1	By Stock, due him per account	1	28	7	3
Contra	Cr.				
1774					
Feb. 19	By Sundries, per J. at 3s 6d	100		17	10
Apr. 19	By Proper Expences taken at 3s 2d	5	5	15	10
			105	18	5 10
Contra	Cr.				
1774					
Feb. 3	By Cash in part	1	30		
Apr. 30	By Balance account	5	5	6	3
			35	6	3
Contra	Cr.				
1774					
Apr. 2	By Cash, at 1s 11d	50	1	4	15 10
3	By William Ainslie, at 2s	30	5	3	
			80	7	15 10
Contra	Cr.				
1774					
Jan. 18	By Sundries, per J. at 1s 9d	150		13	2 6
Feb. 1	By Ja. Boswell, for the rem. at 1s 8½d	40	2	4	2
Apr. 30	By Profit and Loss, Inlake	1		11	4
			200	17	15 10
Contra	Cr.				
1774					
Jan. 13	By Sundries per J.			70	
				70	
Contra	Cr.				
1774					
Feb. 28	By James Boswell, at 3s 4½d	100	2	16	17 6
Mar. 28	By Baillie and Bell, at 3s 7d	150	4	20	17 6
Apr. 2	By Cash, at 3s 6½d	30	1	5	6 3
30	By Balance-account, at 3s 4d	40	5	6	13 4
			320	55	14 7

(4)

LEGER.

Rs.

Dr.		<i>Jo. Henderson stationer Edinburgh,</i>			
1774					
Jan. 14	To Paper, for 12 reams, at 12 s	2	7	4	
Dr.		<i>William Hunter merchant Dunbar,</i>			
1774					
Jan. 18	To Salt, for balance of 150 bushels, per J.	3	3	2	6
Feb. 19	To Meal, for 27 bolls, at 13 s 10 d	1	18	13	6
Dr.		<i>Alexander Sharp merchant Dundee,</i>			
1774					
Feb. 22	To Cash, in full - -	1	32	18	4
Dr.		<i>Charges Merchandize,</i>			
1774					
Feb. 10	To Paper, taken for shop-use, 1 ream	2	-	10	6
Apr. 30	To Cash, for small charges since 1st Jan.	1	5	3	8
	To Tho. Sharp, for wages	5	8	-	-
			13	14	2
Dr.		<i>Baillie and Bell Borrowstonness,</i>			
1774					
Feb. 19	To Meal, for 52 bolls, at 3 s 10 d	1	35	19	4
Mar. 28	To Sundries, per J.	1	42	2	6
Apr. 16	To Cash, pd their bill on me to C. Cowan, st	1	38	18	2
			117	-	-
Dr.		<i>James Dalton Manchester,</i>			
1774					
Mar. 5	To Yarn, for 360 spindles four hank, per J.	2	35	15	-
Dr.		<i>Clover-feed,</i>			
1774					
Mar. 12	To Sundries per J. for pr. cost and char.	1200	29	17	-
Apr. 30	To Profit and Loss, for gain	1	5	-	1
			1200	34	17
Dr.		<i>J. Jonkheer merchant Rotterdam,</i>			
1774					
Apr. 22	To Ro. Bank, for his bill on me paid by them	2	28	12	-
Dr.		<i>Lint-feed,</i>			
1774					
Mar. 17	To Clover-feed, in barter at 55 s	2	4	5	10
Apr. 30	To Profit and Loss, for gain	1	-	18	-
			2	6	8

LEGER.

Rs. (4)

		<i>Contra</i>	<i>Cr.</i>		
1774					
Apr. 30	By Balance-account	-	5	7	4
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Feb. 15	By Cash in full	-	1	3	2
Apr. 30	By Balance-account	-	5	18	13
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Jan. 20	By Yarn, for balance of 300 spindles, per J.	-	2	32	18
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Apr. 30	By Profit and loss	-	1	13	14
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Apr. 8	By William Ainslie, paid him by them	-	5	117	-
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Apr. 7	By Balance-account	-	5	35	15
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Mar. 7	By Sundries per J.	-	400	12	-
Apr. 17	By Sundries per J.	-	330	10	3
Apr. 2	By Cash, at 7½	-	160	5	3
Apr. 30	By Balance-account, at 6 d Inlake	-	300	7	10
			10	-	-
			1200	34	17
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Mar. 12	By Clover-feed, for 6 bags, per. J.	-	6	28	12
Dr.		<i>Contra</i>	<i>Cr.</i>		
1774					
Apr. 2	By Cash	-	1	1	3
Apr. 14	By George Gordon	-	1	5	3
			2	6	8

Dr.

B O O K - K E E P I N G .

1265

(5)

L E G E R .

P r .

L E G E R .

P r . (5)

Dr. 1774 Mar. 21	John Scott farmer at Haughead, To Clover-feed, for 140 lb. at 7½d	4	4	7	6	1774 Apr. 30	Contra By Balance-account	Cr. 5	4	7	6
Dr. 1774 Mar. 25 Apr. 30	Share of Ship Hazard, To William Ainslie, bought ¼ share for To Profit and Loss,	5	150	1	23	1774 Apr. 25 30	Contra By Cash, for share profit of a voyage to Rot. By Balance-account	Cr. 1 5	33 140	— —	— —
Dr. 1774 Apr. 5 10	William Ainslie merchant Alloa, To Sundries, per J. To Baillie and Bell, for bal. paid him by them	33	117	150	—	1774 Mar. 25	Contra By Share of Ship Hazard, for ½ bt. from him	Cr. 5	150	—	—
Dr. 1774 Apr. 30 5	Train-oil, To Cash, at 22s To Profit and Loss, for gain	30	1	33	8	1774 Apr. 11 14	Contra By James Boswell, at 27s By George Gordon, at 28s	Cr. 20 10	2 5	27 14	— —
Dr. 1774 Apr. 14	George Gordon merchant Stirling, To Sundries, per J.	41	3	4	—	1774 Apr. 14 30	Contra By Cash in part By Balance-account	Cr. 1 5	35 6	— 3	4 4
Dr. 1774 Apr. 18 30	Proper Expences, To Calicoes, for 5 yards, at 3s 2d To Cash, for charges since 1st January	3	15	10	32	1774 Apr. 30	Contra By Profit and Loss	Cr. 1	32	15	10
Dr. 1774 Apr. 30	Thomas Sharp, my clerk, To balance-account	5	8	—	—	1774 Apr. 30	Contra By Charges Merchandize, due him for wages	Cr. 4	8	—	—
Dr. 1774 Apr. 30	Balance-account, To Sundries, per J.	757	12	3	—	1774 Apr. 30	Contra By Sundries, per J. By Stock	Cr. 229 528	3 9	2 F	— —
		757	12	3	—				757	12	3

T R I A L -

T R I A L - B A L A N C E .

Dr.		Cr.	
1 Stock	L 312 7 3	L 824 2 8	
Profit and Loss	4 4 10	2 10 —	
Cash	599 15 11	591 12 1	
	<u>L 916 8 —</u>	<u>L 1418 4 9</u>	
2 Meal	L 277 14 8	L 203 18 8	
Port-wine	104 10 —	111 5 —	
Paper	36 15 —	41 13 6	
Yarn	94 17 4	49 12 6	
1 House in Edinburgh	300 — —	— — —	
	<u>813 17 —</u>	<u>406 9 8</u>	
3 James Dowell	L 247 11 —	L 110 — —	
Henry Hardie	31 2 6	— — —	
David Miller	18 — —	— — —	
Royal Bank	140 — —	441 3 2	
	<u>436 13 6</u>	<u>551 3 2</u>	
4 Calicoes	L 16 12 6	L 18 5 10	
James Cuthbert	35 6 3	30 — —	
Diaper	7 — —	7 15 10	
Salt	17 15 10	17 4 6	
	<u>76 14 7</u>	<u>73 6 2</u>	
5 Iron	L 53 6 8	L 49 1 3	
William Bruce	50 — —	70 — —	
John Henderfon	7 4 —	— — —	
William Hunter	18 13 6	— — —	
Charges Merchandize	13 14 2	— — —	
	<u>142 18 4</u>	<u>119 1 3</u>	
6 James Dalton	L 35 15 —	L — — —	
Clover-feed	29 17 —	27 7 1	
Flax-feed	5 10 —	6 8 —	
John Scott	4 7 6	— — —	
Share of Ship Hazard	150 — —	33 — —	
	<u>225 9 6</u>	<u>66 15 1</u>	
7 Train-oil	L 33 — —	L 41 — —	
George Gordon	41 3 4	35 — —	
Proper Expences	32 15 10	8 — —	
Thomas Sharp	— — —	— — —	
	<u>106 19 2</u>	<u>84 — —</u>	
	<u>L 2719 — 1</u>	<u>L 2719 — 1</u>	

COMPU-

C O M P U T A T I O N S.

	Dr.	Cr.		Dr.	Cr.
Cash	L 599 15 11	L 591 12 1	4 Salt	L 17 15 10	L 17 4 6
	591			17	4
	L 8 3 10		Loss	L — 11 4	
2 Meal	L 277 14 8	L 203 18 8	5 William Bruce	L 50 — —	L 70 — —
Dr. 420 bolls		83 14 —			50 — —
Cr. 299	L 83 14 —	L 287 12 8	Iron	L 53 6 8	L 20 — —
		277 14 8	320 stone	L 6 13 4	L 49 1 3
121			280		6 13 4
124					L 55 14 7
					53 6 8
3 outcome	Profit	L 9 18 —	40		
Port-wine	L 104 10 —	L 111 5 —		Profit	L 2 7 11
		104 10 —	J. Henderfon	L 7 4 —	
	Profit	L 6 15 —	W. Hunter	L 18 13 6	
Paper	L 36 15 —	L 41 13 6	Char. Merchan.	L 13 14 2	lofs.
		36 15 —	6 Ja. Dalton	L 35 15 —	
	Profit	L 4 18 6	Clover-feed	L 29 17 —	L 27 7 1
Yarn	L 94 17 4	L 49 12 6	1200 lb.		7 10 —
Spindles		47 8 —	890	L 7 10 —	
834½ 120	L 47 8 —				L 34 17 1
360 120		L 91 — 6			29 17 —
		94 17 4		Profit	L 5 — 1
474½	Profit	L 2 3 2	10 inlake	L 5 10 —	L 6 8 —
Amiffing ½			Lint-feed		5 10 —
Houfe in Edinburgh	L 300 — —				
				Profit	L — 18 —
3 Ja. Bofwell	L 147 11 —	L 110 — —	J. Scott	L 4 7 6	
	110 — —		Share Hazard	L 150 — —	L 33 — —
					140 — —
	L 27 11 —			L 140 — —	
Henry Hardie	L 31 2 6				L 173 — —
David Miller	L 18 — —				150 — —
Royal Bank	L 240 — —	L 441 3 2		Profit	L 23 — —
		240 — —			
		L 201 3 2	7 Train-oil	L 33 — —	L 41 — —
					33 — —
4 Calicoes	L 16 12 6	L 18 5 10		Profit	L 8 — —
		16 12 6	George Gordon	L 41 3 4	L 35 — —
	Profit	L 1 13 4			35 — —
J. Cuthbert	L 35 6 3			L 6 3 4	
	30 — —			L 32 15 10	lofs
			Proper Ex.		L 8 — —
	L 5 6 3		Thomas Sharp		
Diaper	L 7 — —	L 7 15 10			
		7 — —	STOCK	L 312 7 3	L 824 2 8
			Balance	528 9 1	prof. 16 13 8
	Profit	L — 15 10		L 840 16 4	L 840 16 4

P R O F I T A N D L O S S S H E E T .

Salt	-	L 11 4	Meal	-	L 9 18 —
Charges Merchandize	-	13 14 2	Port wine	-	6 15 —
Proper Expences	-	32 15 10	Paper	-	4 18 6
			Yarn	-	2 3 2
In leger	-	L 47 1 4	Calicoes	-	1 13 4
		4 4 10	Diaper	-	— 15 10
			Iron	-	2 7 11
Nett gain	-	L 51 6 2	Clover-feed	-	5 — 1
		16 13 8	Lint-feed	-	— 18 —
			Share of ship Hazard	-	23 — —
		L 67 19 10	Train-oil	-	8 — —
					<hr/>
					L 65 9 10
				In Leger	2 10 —
					<hr/>
					L 67 19 10
					<hr/>

B A L A N C E - S H E E T .

Cash	-	L 8 3 10	Meal, outcome 3 B.	-	L 201 3 2
Meal, 124 b. at 13 s 4 d	-	83 14 —	Royal Bank	-	20 — —
Yarn, 474 sp. at 2 s	-	47 8 —	William Bruce	-	8 — —
Amiffing $\frac{1}{2}$	-		Thomas Sharp	-	<hr/>
Houfe in Edinburgh	-	300 — —			L 229 3 2
James Boswell	-	37 11 —			
Henry Hardie	-	31 2 6			
David Miller	-	18 — —			
J. Cuthbert	-	5 6 3			
Iron, 40 stone at 3 s 4 d	-	6 13 4			
J. Henderfon	-	7 4 —			
W. Hunter	-	18 13 6			
James Dalton	-	35 15 —			
Clover-feed, 300 lb. at 6 d	-	7 10 —			
Inlake 10 lb.	-				
J. Scott	-	4 7 6			
Share of ship Hazard	-	140 — —			
George Gordon	-	6 3 4	STOCK	-	528 9 1
		<hr/>			<hr/>
		L 757 12 3			L 757 12 3
					<hr/>

The present article, it is hoped, will appear sufficiently extended for a work of this nature. It contains the general principles of Italian book-keeping; and is sufficient to unfold the nature and design of that art to the speculative inquirer, to direct the accountant in common and easy cases, and prepare him for understanding those that are more complicated. In fact, if he have a clear apprehension of the sense of the transactions, the tendency of the journal-entries, and the import of the balances in the ledger, he will seldom be at a loss how to proceed.

Subsidiary Books used by merchants.

Tho' all merchant-accounts may be kept by the *Waste-book*, *Journal*, and *Leger*, alone; yet men of great business find it convenient, either for abridging these, or for other ends, to use some others, generally called *Subsidiary* or *Subservient Books*; the most common of which are these nine following, viz.

1. *Cash-book.* This book is kept in a folio form, like the ledger, and serves to abridge the cash-account there. On the left-hand page, or Dr. side, *Cash* is charged Dr. for all the sums received; and on the right-hand page, *Cash* is made Cr. for all the sums paid. Once a-week, or, which is more ordinary, once a month, this book is posted to the ledger; or, if you please first to the journal, by two entries, viz. *Cash* Dr. to *Sundries*, for all the receipts, and *Sundries* Drs. to *Cash*, for all the payments. By this means the cash-account in the ledger will be so far contracted as to consist of 12 lines, viz. one for each month in the year.

2. *Book of Charges of Merchandise.* This book is only paged, and designed to abbreviate the cash-book. It contains particular charges on goods and voyages; such as, carriage, custom, freight, crantage, wharfage, &c: as also other expences that affect trade in general; such as, warehouse-rent, shop-rent, accountant's wages, postage of letters, and the like. At the end of each month the money-columns of this book are added up, and the sum carried to the credit-side of the cash-book.

3. *Book of House-expences.* This book is also paged, and designed likewise to ease the cash-book. It contains all disbursements for family provisions, servant's wages, house-rent, apparel, utensils, &c. The money-columns of this book are also added up at the end of each month, and the sum transferred to the credit-side of the cash-book.

4. *Invoice-book.* This book, which is used chiefly by factors, is paged, and contains doubles or copies of the invoices of goods sent to sea, or of goods received from abroad.

5. *Sales-book.* This book too is chiefly used by factors; and into it is posted, from the waste-book, the particular sales of every consigned cargo; by which means the several articles of a sale, that lie scattered in the waste-book, are brought together, and represented under one view, and that in a manner more full and minute than they are collected in the ledger-account. This book exhibits the sales of every consignment sepa-

rately and by themselves: to which are subjoined the respective charges, such as freight, custom, the factor's commission, as also abatements allowed to buyers, &c. whose sum subtracted from the gross amount of sales, gives the neat proceeds. From this book, when a cargo is sold off, an account of sales is drawn out, in order to be transmitted to the employer.

6. *Bill-book.* The design of this *Bill-book*, or *Month-book*, is to furnish a merchant with a ready way of knowing the time when bills or other debts become payable to or by him. It consists of 12 folios, one for each month in the year. The left-hand page contains the debts that fall due to the merchant in the month on the top, and the right-hand page contains the debts payable by him to others in the same month.

7. *Receipt-book.* In this book a merchant takes receipts of the payments he makes. The receipt should contain the date; the sum received, expressed in words at large, and also in figures in the money-columns; the reason why; and whether in full or in part; and must be signed by the person receiving. But there is no occasion to mention the merchant's name; for the book being his own, sufficiently implies that.

8. *Letter-book.* It is very imprudent in any person to send away a letter of business, without keeping a double of it to himself; and therefore, to prevent the bad consequences of such a careless practice, merchants are provided with a large book in folio, into which is copied *verbatim* every letter of business before it be sent off. So that this book, together with the letters received (which must also be carefully kept in files or boxes), makes a complete history of all the dealings that pass betwixt a merchant and his correspondents; which may be very useful and necessary on many occasions.

9. *Pocket-book.* This is a small book, of a portable size, which a merchant carries in his pocket when business calls him abroad to a tavern, a fair, the country, or other places. In this he sets down the bargains he makes, the expences he is at, the debts he pays, or sums he receives, with every other part of business he transacts while abroad; as also any occurrence or piece of news he thinks worth while to record. And when he comes home to his counting-house or shop, he transfers the things contained in this book, each to their proper places in the waste-book, or books subsidiary.

Factors of great business sometimes keep another small book, called the *Memorandum-book*. Into this book is copied, from letters as they come to hand, short notes of the several commissions for buying goods contained in them; and as the commissions are effected, the notes are crossed, or have some mark affixed to them. This is more convenient in doing business, than to be continually running to the letters themselves.

The above are the subsidiary books most in use: but a merchant is not tied down or restricted to them; he may keep some, and neglect others, or invent more, as the nature of his business requires, and he finds convenient.

B O O

B O O

BOOKSELLER, one who trades in books, whether he prints them himself, or gives them to be printed by others.

Bookfellers are in many places ranked among the members of universities, and intitled to the privilege of students, as at Tubingen, Salisburg, and Paris, where

Boom
||
Boot.

they have always been distinguished from the vulgar and mechanical traders, and exempted from divers taxes and impositions laid upon other companies.

The traffic of books was anciently very inconsiderable, inasmuch that the book-merchants of England, France, Spain, and other countries, were distinguished by the appellation of *stationers*, as having no shops, but only stalls and stands in the streets. During this state, the civil magistrates took little notice of the book-sellers, leaving the government of them to the universities, to whom they were supposed more immediate retainers; who accordingly gave them laws and regulations, fixed prices on their books, examined their correctness, and punished them at discretion.

But when, by the invention of printing, books and book-sellers began to multiply, it became a matter of more consequence; and the sovereigns took the direction of them into their own hands, giving them new statutes, appointing officers to fix prices, and granting licences, privileges, &c.

BOOM, in the sea language, a long piece of timber with which the clew of the fludding sail is spread out; and sometimes the boom is used to spread or boom out the clew of the main-mast.

BOOM, denotes also a cable stretched athwart the mouth of a river or harbour; with yards, top-masts, battling or spars of wood lashed to it, to prevent an enemy's coming in.

BOOMING, among sailors, denotes the application of a boom to the sails. A ship is said to come booming forwards, when she comes with all the sail she can make.

BOOPHTHALMUS, a kind of agate with large circles in it, bearing some resemblance to an ox's eye, from whence it has got this name.

BOOPS, in zoology, the trivial name of a species of balena. See **BALÆNA**.

BOOT, a leathern cover or defence for the leg, used on horseback, both to keep the body more firm, and defend the part from the injuries of the weather. Boots seem to have taken their name from the resemblance they bear to a sort of jacks or leathern bottles formerly in use, and called *bottæ*, in the old French *bouts*. Borel derives the name from the old French word *bot*, a stump, by reason the boot gives the leg this appearance. The Chinese have a kind of boots made of silk or fine stuff lined with cotton, a full inch thick, which they always wear at home. This people are always booted; and when a visit is made them, if they happen to be without their boots, their guest must wait till they put them on. They never stir out of doors without their boots on; and their scrupulousness in this respect is the more remarkable as they are always carried in their chairs.

The boot was much used by the ancients, by the foot as well as by the horsemen. It was called by the ancient Romans *ocrea*; in middle-age writers, *greva*, *gambiera*, *hainberga*, *bembarga*, or *bembarga*. The boot is said to have been the invention of the Carians. It was at first made of leather, afterwards of brass or iron, and was proof both against cuts and thrusts. It was from this that Homer calls the Greeks *brazen-booted*. The boot only covered half the leg; some say the right leg, which was more advanced than the left, it being advanced forwards in an attack with the sword; but

in reality it appears to have been used on either leg, and sometimes on both. Those who fought with darts or other missile weapons, advanced the left leg foremost, so that this only was booted.

Boot-Tree, or **Boot-laff**, an instrument used by shoemakers to widen the leg of a boot. It is a wooden cylinder slit into two parts, between which, when it is put into the boot, they drive by main force a wedge or quoin.

BOOTES, a constellation of the northern hemisphere, consisting of 23 stars according to Ptolemy's catalogue, of 18 in Tycho's, of 34 in Bayer's, of 52 in Hevelius's, and of 54 in Mr Flamsteed's catalogue.

BOOTH (Barton), a famous English actor, born in Lancashire in 1681, and educated in Westminster school under the celebrated Dr Busby, where his successes in the Latin plays customarily performed by the scholars gave him an inclination for the stage. He was intended for the church; but running away from school to Dublin, he there commenced actor. His first appearance was in the part of Oroonoko, in which he came off with every testimonial of approbation from the audience. From this time he continued daily improving; and, after two successful campaigns in that kingdom, conceived thoughts of returning to his native country, and making a trial of his abilities on the English stage. To this end, he first, by letter, reconciled himself to his friends; and then, as a farther step towards insuring his success, obtained a recommendation from Lord Fitzharding (one of the lords of the bed-chamber to prince George of Denmark) to Mr Betterton, who with great candour and good-nature took him under his care, and gave him all the assistance in his power. The first part Mr Booth appeared in at London was that of Maximus in Lord Rochester's Valentinian, his reception in which exceeded even his most sanguine expectations; and very soon after his performance of Artaban, in Rowe's Ambitious Step-mother, which was a new tragedy, established his reputation, as second at least to his great instructor. Pyrrhus, in the Distressed Mother, was another part in which he shone without a rival. But he was indebted to a happy coincidence of merit and chance, for that height of fame which he at length attained in the character of Cato, as drawn by Mr Addison, in 1712. For this play being considered as a party one, the Whigs, in favour of whose principles it was apparently written, thought it their duty strongly to support it, while at the same time the Tories, who had too much sense to appear to consider it as a reflection on their administration, were still more vehement in their approbation of it, which they carried to such an height, as even to make a collection of 50 guineas in the boxes during the performance, and present them to Mr Booth with this compliment, "That it was a slight acknowledgment for his honest opposition to a perpetual dictator, and his dying so bravely in the cause of liberty." Besides this, he had a present of an equal sum from the managers, in consideration of the great success of the play, which they attributed in a good measure to his extraordinary merit in the performance; and certain it is, that no one since that time has ever equalled, or even nearly approached, his excellence in that character.—But these were not the only advantages which were to accrue to Mr Booth from his success in this part; for

Boot
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Booth.

Lord

Booth,
Booty.

Lord Bolingbroke, then one of the principal secretaries of state, in a little time after procured a special licence from queen Anne, recalling all the former ones, and nominating Mr Booth as joint manager with Wilks, Cibber, and Dogget; none of whom were pleased at it; but the last especially took such disgust as to withdraw himself from any further share in the management. In 1704, Mr Booth had married a daughter of Sir William Barkham Bart. who died in 1710, without issue. Being now established in the management, he once more turned his thoughts towards matrimony; and in the year 1719 united himself to the celebrated Miss Hester Santlow, a woman of a most amiable disposition, whose great merit as an actress, added to the utmost discretion and prudent economy, had enabled her to save up a considerable fortune. During the 20 years in which Mr Booth continued a manager, the theatre was in the greatest credit; and his illness and death, which happened on the 10th of May 1733, contributed not a little to its decline.

Mr Booth wrote a dramatic entertainment called *Dido and Aeneas*; but his master-piece was a Latin inscription to the memory of Mr William Smith, a celebrated actor, who died while he was young.—As an actor, his excellency lay wholly in tragedy, not being able to endure such parts as had not strong passion to inspire him. And, even in this walk, dignity rather than complacency, rage rather than tenderness, seemed to be his taste. For a particular idea of his abilities, we must refer to the description Mr Cibber has given of him in his Apology; and the admirable character drawn of him by that excellent judge of dramatic perfection, Aaron Hill, Esq. in a political paper published by him called the *Prompter*, which may be seen at length in Theoph. Cibber's *Lives of the Poets*, and Chetwood's *History of the Stage*.—His character as a man was adorned with many amiable qualities, among which, a goodness of heart, the basis of every virtue, was remarkably conspicuous; and so particularly was he distinguished and cherished, and his company sought by the great, that, as Chetwood relates of him, not one nobleman in the kingdom had so many sets of horses at command as he had.

BOOTY, whatever is taken from an enemy in time of war.—Among the Greeks, the booty was divided in common among the army, the general only claiming a larger share. By the military discipline of the Romans, spoils taken from the enemy belonged to the republic, particular persons having no right to them. The generals who piqued themselves on their probity carried it wholly to the public treasury. Sometimes indeed they divided it among the soldiery, to animate them, and serve in lieu of a reward. But this distribution depended on the generals, who were to conduct themselves herein with great equity and moderation; otherwise it became a crime of peculate to lay hands on the pillage, as regularly belonging only to the state. The consuls Romulus and Vatorius were condemned for having sold the booty taken from the Æqui.—Among the Jews, the booty was divided equally between the army and the people, though under the kings a different kind of distribution obtained.—Among the Mahometans, two thirds of the spoils are allowed to the army; the other third to God, to Mahomet and his relations, and to the orphans, the poor, and the pilgrims.—

Among us, formerly the booty was divided among the soldiery. If the general be in the field, every body takes what he can lay hold on: if the general be absent, the booty is distributed among the soldiery, two parts being allowed to the cavalry, and one to the infantry. A captain is allowed ten shares, a lieutenant six, and a cornet four.

BOPPART, a town of Germany, in the circle of the Rhine, and Electorate of Treves; it is seated at the foot of a mountain near the Rhine, in E. Long. 7. 35. N. Lat. 50. 19.

BOPSINGEN, a town of Suabia in Germany, seated on the river Egar, in E. Long. 9. 55. N. Lat. 48. 51.

BOQUINIANS, in church-history, a sect of heretics, so called from Boquinius their founder, who taught that Christ did not die for all mankind, but only for the faithful, and consequently was only a particular Saviour.

BORAGO, in botany, a synonyme of the *ACHYSA*.

BORAK, among Mahometans, a fabulous animal, supposed to be of the middle kind between an ass and a mule, whereon their prophet was carried in his nocturnal flight from Jerusalem into the heavens. This animal the Arabians call *Al-Borak*, q. d. *shining*. The night when the journey was performed is called *Lailat al-Meeraga*, i. e. *the night of ascension*; and the flight itself *Al-Mefra*; concerning which there are a multitude of traditions.

BORAX, a saline substance brought from the East Indies, much used in the soldering of metals, making glass, &c. &c. As a medicine too it has by some been held in considerable esteem; but its virtues in this way have never yet been sufficiently ascertained by experience, tho' Dr Lewis thinks there are strong reasons for believing them greater than they are generally supposed. In doses of half a dram or two scruples, it is recommended as a diuretic, emmenagogue, and promoter of delivery; with this last view it was an ingredient in the *pulvis ad partum*, or powder to promote delivery, of the Edinburgh college. Dr Bisset, in an essay on the medical constitution of Great Britain, recommends a solution of this salt in water, as the most powerful dissolvent yet known of apthous crusts in the mouth and fauces of children. Dr Alston of Edinburgh says that it should be dissolved when taken inwardly, for that the stomach is not able to melt it; but that, if given in a dissolved state, it enters the vasa minima, mixes with the blood, and dilutes it. If given in powder, it is emetic; but, mixed with aromatics, this quality is checked; and in the fluor albus it is said to be specific. Its doze is from five grains to half a dram. Externally used, borax is said to be a better cosmetic than bismuth, and is undoubtedly much safer.

BORBETOMAGUS, (anc. geog.), a city of the Vangiones on the Rhine; now *Worms*, in Germany.

BORBONIA, in botany, a genus of the decandria order, belonging to the diadelphia class of plants, for which there is no English name. There are six species, all of which are natives of warm countries. They are a kind of broom; and in the places where they grow naturally, they rise to the height of ten or twelve feet, but in Europe seldom rise more than four or five. They must be kept constantly in the stove, and may be propagated by laying down the young shoots; but as these

Boppart

Borbonia.

† See Chemi-
stry, n^o 265
—273; and
Glass.

Barborites

Borde.

are generally two years before they put forth proper roots, the most eligible method is by seeds, which must be procured from those places where they grow naturally, as they do not come to perfection in this country.

BORBORITES, in church-history, a sect of gnostics, in the second century, who, besides embracing the errors of these heretics, denied the last judgment. Their name comes from the Greek *Barboros*, filth; on account of a custom they had of daubing their faces and bodies with dirt and filth.

BORCH, a town of the duchy of Magdeburgh in Lower Saxony, seated on the river Elbe, in E. Long. 12. 14. N. Lat. 52. 25.

BORCHLOEN, a town of the bishopric of Liege in Germany, situated in E. Long. 5. 28. N. Lat. 50. 50.

BORCOVNIUM, (anc. geog.), a town of the Ottadini in Britain, now *Berwick on Tweed*.

BORD-HALFPENNY, a small toll by custom paid to the lord of the town for setting up boards, tables, booths, &c. in fairs and markets.

BORD-Lands, the demesnes which lords keep in their hands for the maintenance of their board or table.

BORD-Lode, a service required of tenants to carry timber out of the woods of the lord to his house. It is also used to signify the quantity of provision which the bordarii or bordenmen paid for their bord-lands.

BORD-Service, the tenure of bord-lands, by which some lands in certain places are held of the bishop of London, and the tenants now pay sixpence per acre, in lieu of sending provision anciently for their lord's table.

BORDAT, in commerce, a small narrow stuff, which is manufactured in some parts of Egypt, particularly at Cairo, at Alexandria, and Damietta.

BORDE (Andrew), a physician, was born at Pevensey in Sussex, early in the 16th century, and supposed to have been educated at Westminster school. In his *Introduction to Knowledge*, he says that he was a student of Oxford; but of what college, he does not mention. He left the university without a degree, and entered himself a brother of a Carthusian convent in or near London; but, not liking the severe discipline of that order, he returned to Oxford, and applied himself to the study of physic. Some time after, he embarked for the Continent; and, as he himself expresses it, "travelled through and round about Christendom, and out of Christendom into some parts of Africa." In the years 1541 and 1542, he resided at Montpellier in France, where he was made doctor of physic, and after his return to England was incorporated into the same degree at Oxford. From the preface to his *introduction* above mentioned, it appears that he had been in Scotland, which probably was soon after his return from France. Having now satisfied his inclination for travelling, he settled first at Pevensey where he was born, afterwards at Winchester, and finally in London, where he is said to have become a fellow of the college of physicians, and first physician to king Henry VIII. But, notwithstanding his eminence in his profession, he had the misfortune to spend the latter end of his life in the Fleet prison, where he died in the year 1549. As to his character, Wood says, that "he was esteemed a noted poet, a witty and ingenious person, and an excellent physician." Pits calls him a man of sufficient

learning, but too volatile and inconstant. Bale and some others, on the contrary, abuse him grossly. His writings are, 1. A book of the introduction of knowledge, the which doth teach a man to speak part of all manner of languages, &c. Lond. 1542, 4to; dedicated, from Montpellier, to the lady Mary daughter to Henry VIII. It is written partly in verse, and partly in prose, containing 39 chapters, before each of which is a wooden print of a man. 2. The breviary of health, wherein are remedies for all manner of sicknesses and diseases, &c. Lond. 1547, &c. 4to. 3. Dietary of health, Lond. 1576, 8vo. 4. The merry tales of the madmen of Gotham. Printed, says Wood, in the time of Henry VIII. in whose reign, and after, it was accounted a book full of wit and mirth by scholars and gentlemen. Afterwards being often printed, it is now sold only on the stalls of ballad-vendors. 5. A right pleasant and merry history of the mylner of Abington, with his wife and his fair daughter, and of two poor scholars of Cambridge. Lond. printed by Richard Jones, 4to. 6. A book of every region, country, and province; which shews the miles and leagues distance from city to city, and from town to town, with the noted things in the said cities and towns. Wood says that the author lent the manuscript of this book to his friend Thomas Cromwell, who lost it, to the great grief of the author, who would otherwise have published it. In this instance, however, the antiquary was misinformed; for it has since been published by Hearne at the end of *Benedictus abbas Peterb. de vita Henrici II.* Oxf. 1735, 8vo. 7. The principles of astronomy, the which diligently perfected is in a manner a prognostication to the world. Lond. printed by Robert Copland, 12mo. The author says that he wrote this little book in four days, with one old pen without mending.

BORDER, in gardening, is made to inclose parterres, that they may not be injured by walking in them. Borders are made either circular, straight, or in cants; and are turned into knots, scrolls, volutes, and other compartments. They are rendered very ornamental by the flowers, shrubs, yews, &c. that are raised in them. They are always laid with a sharp rising in the middle; because, if they are flat, they are noways agreeable to the eye; and as for their breadth, the largest are allowed five or six feet, and the smallest commonly four.

BORDUNI, or **BORDONE**, (Paris), an excellent Italian painter, was born at Venice about the year 1512; and, being of a noble family, had a polite education. He was the disciple of Titian; but has been admired more for the delicacy of his pencil than for the truth of his outlines. He was at the court of France in the reign of Francis I. who had a great esteem for him, and for whom he drew not only abundance of history-pieces, but the portraits of several court-ladies, in so fine a manner, that original nature was hardly more charming. He at length returned to Venice, laden with riches and honour; and having gained great reputation in all parts of Italy, died in 1587, aged 75.

BORDURE, in heraldry. See there, n^o 10.

BORE, among engineers, denotes the diameter of the barrel of a gun or cannon, or rather its whole cavity.

BOREAS, a Greek name, now in common use for the

Borde

Boreas.

Borel
Borgia.

the north-wind. Pezron observes, that anciently Boreas signified the *North-east wind*, blowing at the time of the summer solstice. Boreas is represented in painting like an old man with a horrible look, his hair and beard covered with snow or hoar frost, with the feet and tail of a dragon. M. Spierlingius has a treatise in praise of Boreas, wherein he shews the honours paid to him by antiquity. Boreas, according to this author, purifies the air, renders it calm and salubrious, preserves buildings from decay, drives away the plague and other noxious diseases, and expels locusts and other vermin hurtful to the grounds.

BOREL (Peter), a learned physician, was the son of James Borel who published several poems, and was born at Castrès in 1620. He applied himself to the study of physic, of which he was created doctor, and practised with great success in the city of Castrès. Towards the end of the year 1653, he went to Paris, and was soon after made physician in ordinary to the king. In 1674, he was received into the academy of sciences, and distinguished himself by writing a great number of works. The most esteemed are, 1. *Historicum & observationum medico-physicarum*. 2. *Bibliotheca Chymica, duodecimo*. 3. *De vero telescopii inventore, cum brevis omnium conspiciendorum historia*. He died in 1678.

BORELLI (John Alphonso), a famous philosopher and mathematician born at Naples the 28th of January 1608. He was professor of philosophy and mathematics in some of the most celebrated universities of Italy, particularly at Florence and Pisa, where he became highly in favour with the princes of the house of Medicis; but having been engaged in the revolt of Messina, he was obliged to retire to Rome, where he spent the remainder of his life under the protection of Christina queen of Sweden, who honoured him with her friendship, and by her liberality towards him softened the rigour of his hard fortune. He continued two years in the convent of the regular clergy of St Pantalœon, called the *pious schools*, where he instructed the youth in mathematical studies. He died there of a pleurisy, the 31st of December 1679, in the 72^d year of his age. He wrote, in Latin, 1. *Euclid restored*. 2. *The theory of the influence of the planets in medicine, deduced from physical causes*. 3. *Of percussive force*. 4. *Of natural motions depending upon gravity*. 5. *An historical and meteorological account of the burning of mount Ætna, in the year 1669*. 6. *Of the motion of animals; and several other works, some of which are in Italian*.

BORGIA (Cæsar), natural son of pope Alexander VI. was a brave general, but a most abandoned villain. See (*History of*) ITALY. — It is incredible what numbers he caused to be taken off by poison, or by the sword; and it is notorious that swarms of assassins were constantly kept in pay by him at Rome, for the sake of removing all who were either obnoxious or inconvenient to him. He experienced various turns of fortune; and was sometimes very prosperous, sometimes the reverse. He very narrowly escaped dying by poison in 1503: for having concerted with the pope a design of poisoning nine newly created cardinals at once, for the sake of possessing their effects, the poisoned wine, destined for the purpose, was by mistake brought to and drank by themselves. The pope died of it; but

Borgo
Boring.

Cæsar, by the vigour of his youth, and the force of antidotes, after many struggles, recovered. He only recovered to outlive his fortune and grandeur, to see himself depressed, and his enemies exalted; for he was soon after divested of all his acquisitions, and sent a prisoner to Spain, in order to free Italy from an incendiary, and the Italian princes from those dangers which the turbulent and restless spirit of Cæsar made them fear even though he was unarmed. He escaped from thence; and got safe to Navarre, to king John his brother-in-law, who was then at war with his subjects. Cæsar served as a volunteer in that war, and was killed in 1507.

BORGÓ, an ancient town of Sweden, seated on the gulf of Finland, in the province of Nyland. E. Long. 26. 25. N. Lat. 60. 34.

Borgo de *St Sepulchro*, a town of Tuscany, in Italy, situated in E. Long. 13. 0. N. Lat. 43. 30.

Borgo de *val de Furo*, a town of Italy, in the duchy of Parma, in E. Long. 10. 36. N. Lat. 44. 35.

Borgo-*Fortè*, a town of the Mantuan in Italy, situated at the confluence of the rivers Po and Menzo. E. Long. 11. 0. N. Lat. 44. 50.

Borgo *San Domino*, a town of Italy, in the duchy of Parma, with a bishop's see. E. Long. 10. 31. N. Lat. 41. 53.

BORGOGNONE, a celebrated painter, whose true name was *Giacomo Corteffi*; but he is commonly called *Borgognone*, from the country where he was born, about the year 1605. He was much admired and highly applauded for his admirable gusto, and grand manner of painting battles. He had for several years been conversant in military affairs, was an officer of considerable rank in the army, made the camp his school, and formed all his ideas from what he had seen performed in the field. His style is roughly noble, full of fire and spirit, and there are a few prints etched by his own hand. Towards the close of his life he retired to the Jesuits convent in Rome, where he is said to have taken sanctuary to rid his hands of an ill bargain he had got of a wife. But happily surviving her, he lived in great esteem and honour till after the year 1675.

BORIA, a small town of Spain, in the kingdom of Arragon. W. Long. 2. 2. N. Lat. 41. 50.

BÖRING, in a general sense, the art of perforating, or making a hole through any solid body.

BORING of *Water-pipes*. The method of boring water-pipes is as follows. The poles of alder, which is a very useful wood in making pumps, water-pipes, &c. being laid on horses or trassels of a foot height, to rest the augre upon while they are boring, they set up a lath to turn the least end of the poles, to fit them to the cavities of the great end of the others. They turn the small ends of the poles about five or six inches in length, to the size they intend to bore the bigger ends about the same depth, viz. five or six inches. This is designed to make a joint to shut each pair of poles together, the concave part being the female part, and the other the male of the joint. In turning the male part, they turn a channel in it, or a small groove at a certain distance from the end; and in the female part they bore a small hole to fit over this channel. This being done, they bore the poles through; and to prevent them from boring out at the side, they tick great nails at each end to be a guide in boring. It is usual, however,

Boring
||
Borneo.

however, to bore them at both ends, so that if a pole be crooked one way, they can bore it through and not spoil it.

BORING, in farriery, a cruel and absurd method of treating a wrenched shoulder. See FARRIERY, § xxiii. 7.

BORING, in mineralogy, a method of piercing the earth with scooping irons, which being drawn back at proper times, bring up with them samples of the different strata through which they have passed; by the examination of which the skilful mineralogist will be able to guess whereabouts a vein of ore may lie, or whether it will be worth while to open a mine there or no.

BORIQUEN, one of the Caribbee islands in North America, near that of Porto Rico. The English formerly had a settlement there, but were driven away by the Spaniards. It is at present without inhabitants, tho' agreeable and fertile; the air being wholesome, and the water good. There are a great number of land-crabs, whence some have called it *Crab-island*. W. Long. 64. 35. N. Lat. 18. o.

BORISTHÈNES, (anc. geog.), the largest river of Sarmatia Europea, thus described by Mela, who copies *verbatim* from Herodotus: "It runs through a cognominal people, is the most pleasant of all the rivers of Scythia, and calmer than all of them in its course, and very agreeable to drink: it feeds very rich pastures, and produces large fish of the best flavour, and without bones: it comes a great way, rising from springs unknown; its course is a distance of 40 days, and so far it is navigable." It is now called the *Dnieper* or *Nieper*.

BORKELO, a strong town in the United Provinces, in the county of Zutphen, seated on the river Borkel, in E. Long. 6. 30. N. Lat. 52. 15.

BORLASE (Dr Edmund), an eminent physician and English writer in the 17th century, was the son of Sir John Borlase, master of the ordnance, and one of the Lord Justices of Ireland in 1643. He studied in Dublin college, and afterwards at the university of Leyden, at which last place he took the degree of doctor of physic. He afterwards practised physic with great success in the city of Chester, and was incorporated doctor of the faculty in the university of Oxford. Among the books which he wrote and published are the following. 1. *Latham Spaw* in Lancashire, with some remarkable cures and cures performed by it. 2. *The reduction of Ireland to the crown of England*. 3. *The history of the Irish rebellion*. 4. *Brief reflections on the earl of Castlehaven's memoirs, &c.* He died after the year 1682.

BORMIO, a county depending on the republic of the Grisons in Switzerland. It is bounded on the south by the estate of Venice, on the east by the territory of the house of Austria, and on the south and west by Caddeia. It is 15 miles over both ways; and is divided into five communities, viz. the town of Bormio, the valley of Forbia, the Interior Valley, the Lower Valley, and the Valley of Luveno. Bormio is the only town in this district; and has a governor called a *podesia*, sent by the Grisons to preside in civil and criminal affairs. It is seated at the confluence of the rivers Addo and Ifalacua, in E. Long. 10. 10. N. Lat. 46. 45.

BORNE, a market-town of Lincolnshire in England. W. Long. o. 20. N. Lat. 52. 40.

BORNEO, an island of Asia, in the East Indies,

and one of the three great Sunda islands. It is thought to be the largest island in the world, next to New Holland; being 1500 miles in circumference. It is seated under the equator, that line cutting it almost through the middle. It is almost of a circular figure; abounds with gold; and the finest diamonds in the Indies are found in its rivers, being probably washed down from the hills by torrents. Here are also mines of iron and tin, and loadstones. Birds nests † are to be had in this island, which are eatable, and reckoned a great delicacy. The beasts are, oxen, buffaloes, deer, goats, elephants, tigers, and monkeys. This island has fine rivers, especially towards the west and south. In their moonsoon from April to September, the wind is westerly; and they have continual heavy rains, attended with violent storms of thunder and lightning. The rainy season continues for eight months of the year; and as during that time all the flat country near the coast is overflowed, the air is rendered very unhealthful, and the inhabitants are forced to build their houses on floats, which they make fast to trees. The houses have but one floor, with partitions made with cane; and the roofs are covered with palmetto leaves, the eaves of which reach within four or five feet of the bottom. The west and north-east sides of the island are almost desert, and the east is but little known. The inland parts are very mountainous; and the south-east, for many leagues together, is a sinking morass, which being overflowed in the wet season is very unhealthful.

The Portuguese, who first discovered Borneo, had arrived in the Indies above 30 years before they knew any thing of it more than the name, and its situation, by reason of their frequently passing by its coasts. At last one captain Edward Corril had orders to examine it more narrowly; and being once acquainted with the worth of the country, they made frequent voyages thither. They found the coasts inhabited by Malayam Moors, who had certainly established themselves there by conquest; but the original inhabitants still remain in the mountains, and are called *Beajus*, which in the Malayan language signifies a *wild man*. The most authentic account of these people is the following, which was extracted from the papers of father Antonio Ventimiglia, an Italian missionary. He was sent to Borneo from Macao, on board a Portuguese ship, converted great numbers to Christianity, and died on the island about the year 1691. The Beajus have no kings, but many little chiefs. Some are subject to the Moorish kings, and pay them tribute; but such as live far up the country, are altogether independent, and live according to their own customs. They are generally very superstitious, and much addicted to augury. They do not adore idols; but their sacrifices of sweet wood and perfumes are offered to one God, who, they believe, rewards the just in heaven, and punishes the wicked in hell. They marry but one wife; and look upon any breach of conjugal faith, either in the man or woman, as a capital offence. The Beajus are naturally honest and industrious, and have a brotherly affection for one another. They have a notion of property, which yet does not render them covetous. They sow and cultivate their lands; but, in the time of harvest, each reaps as much as will serve his family, and the rest belongs to the tribe in common; by which means they prevent necessity

Borneo.

† See Birds' Nests.

Bornholm,
Bornou.

necessity or disputes. With the Moors on the coasts the Portuguese for some time carried on a considerable trade, and at their request settled a factory there; which, however, was afterwards surprised and plundered by the Moors, who put most of the people to the sword. The most considerable river in Borneo is called *Banjar*, at the mouth of which our East-India company have a factory.

BORNHOLM, an island in the Baltic sea, to the south-east of the province of Schonen in Sweden. It is twenty-one miles in length, and above thirteen in breadth. It has three considerable towns, Rattum, Sandwick, and Nexia; with a great number of villages; and is fertile and populous. It was conquered by the Swedes in 1658; but the inhabitants, under the conduct of Jens Roefelds, voluntarily surrendered it to the king of Denmark, on account of the bad usage they received from the former. In 1678, a body of 5000 Swedish troops, in their passage from Pomerania to Sweden, being shipwrecked on this island, such of them as remained were made prisoners of war. The inhabitants defend the island by their own militia, without any expence to the crown. The commandant or governor resides at Rattum. E. Long. 14. 56. N. Lat. 55. 15.

BORNOU, a kingdom or province of Zaara in Africa, extending from 12 to 22 degrees of east longitude, and from 17 to 21 degrees of north latitude. The northern part is poor, and like the rest of the provinces of Zaara: but all the rest is well watered by springs and rivers that tumble down with a dreadful noise from the mountains; rendering the country prolific in corn, grass, and fruits, and giving it a pleasing aspect. The eastern and western frontiers are divided into mountains and valleys, the latter being all covered with flocks of cattle, fields of rice and millet, and many of the mountains with wood, fruit-trees, and cotton. On the north-west stands the mountain of Tarton, having plenty of good iron mines; and on the south flows the river Niger, which, it is said, after running a great many leagues under a long chain of mountains, rears up its head again, and mingles its stream with the waters of the lake Bornou in its course, from whence it washes the walls of the capital of this kingdom. The compilers of the Universal History, however, are of opinion, that in these mountains the river Niger hath its source, because no river hath been traced to the eastward, except the Nile, which runs in a different course from north to south, and the White river, on the western frontiers of Abyssinia, which is a branch of the Nile. The eastern and western parts of Bornou are inhabited by a people of a roving disposition, who live in tents, and have their women, children, and every thing else, in common; the word *property*, or any idea equivalent to it, being utterly unknown among them. They have neither religion, laws, government, nor any degree of subordination; and hence they have been supposed by Cluverius to be the lineal descendants of the ancient Garamantes, and this to have been the residence of that people. In these parts, the natives are almost to a man shepherds and husbandmen. In summer they go naked, except a short apron before; but in winter they are warmly clothed with the softest sheepskins, of which they also form their bed-cloaths; and indeed this is scarce a sufficient defence against the in-

clemency of the weather at certain seasons of the year, when a cold piercing wind blows from the northern mountains, that chills the blood in proportion as the pores of the body have been opened by the scorching heats of summer. Baudrand and Daper affirm that the natives are scarce superior in their understanding to brutes; not even having any names whereby to distinguish each other, except what they take from some personal defect or singularity; such as lean, fat, squinting, hump-backed, &c. In the towns, however, it is acknowledged that they are something more civilized and polite, being many of them merchants; but of these towns, or indeed of the kingdom in general, very little is known.

BOROMEUS (Frederic), cardinal and archbishop of Milan. He, in 1609, celebrated the council of Milan. He founded the Ambrosian library, which he enriched with 9000 manuscripts. He left several works behind him, and died in 1632.

BORONDON, (S^t), an island in the Atlantic Ocean, mentioned by some writers, particularly Linschotten, in their description of the Canary islands, as something supernatural. It is said to be about 100 leagues distant from Ferro, probably west, though no writer has pretended to lay down its exact situation. Here it is affirmed several ships have touched by accident, and all agree in their relations of the state of the inhabitants and island. They affirm, that it is perpetually clothed with a great variety of wood, chiefly fruit-trees: that the valleys are in a perpetual state of verdure; and continually decked with flowers, grass, and plants, the spontaneous productions of the earth; or with corn and pulse, cultivated with great care by the inhabitants: that the soil is so prolific as to raise large quantities of corn for exportation; and that the ships that call here never fail of meeting with refreshments of every kind. It is said to be peopled by Christians, who have a language of their own, apparently combined of a variety of modern languages; for, say they, whoever understands the European tongues may make shift to hold conversation with this people. It is remarkable, that no ships, expressly sent upon this discovery, were ever fortunate enough to fall in with the island of S^t Borondon, though the Spaniards have several times attempted it from the Canaries. Hence it has been called the *marvellous island*; and hence indeed we may conclude, either that it exists wholly in imagination, or at least that it is surrounded with such currents as infallibly carry ships out of their course, and prevent their meeting with it. Some writers affirm that it actually disappears upon certain occasions, and shifts its position; while others, with more appearance of truth, allege, that it is frequently overcast with thick and impenetrable clouds, which occasion the disappointment of all the adventurers who have gone in search of it.

BOROUGH, **BURROUGH**, *Borow*, or *Burgh*, a corporation or town which is not a city. The word in its original signification meant a company consisting of ten families, which were bound together as each others pledge. Afterwards *borough* came to signify a town having a wall or some inclosure round it: and all places that in old time had the name of *borough*, it is said, were fortified or fenced in some shape or other. *Borough* is a place of safety and privilege: and some are called *free burghs*, and the tradesmen in them *free burghers*.

Doromati
Borough.

Borough
Borrellists.

burghes, from a freedom they had granted to them originally to buy and sell without disturbance, and exempt from toll.

BOROUGH-English, a customary descent of lands or tenements, in some ancient boroughs and copy-hold manors, by which the youngest son, and not the eldest, succeeds to the burghage tenement on the death of his father. For which Littleton gives this reason; because the younger son, by reason of his tender age, is not so capable as the rest of his brethren to help himself. Other authors have indeed given a much stranger reason for this custom; as if the lord of the fee had anciently a right to break the seventh commandment with his tenant's wife on her wedding night; and that therefore the tenement descended, not to the eldest, but to the youngest son, who was more certainly the offspring of the tenant. But it cannot be proved that this custom ever prevailed in England, though it certainly did in Scotland, (under the name of *mercheta*, or *marcbeta*), till abolished by Malcom III. But perhaps a more rational account than either may be brought from the practice of the Tartars; among whom, according to Father Duhalde, this custom of descent to the youngest son also prevails. That nation is composed totally of shepherds and herdsmen; and the elder sons, as soon as they are capable of leading a pastoral life, migrate from their father with a certain allotment of cattle, and go to seek a new habitation. The youngest son, therefore, who continues latest with his father, is naturally the heir of his house, the rest being already provided for. And thus we find, that among many other northern nations it was the custom for all the sons but one to migrate from the father, which one became his heir. So that possibly this custom, wherever it prevails, may be the remnant of that pastoral state of the ancient Britons and Germans which Cæsar and Tacitus describe.

BOROUGH-head, or *Head-borough*, called also *borough-holder*, or *burghholder*, the chief man of the decenna, or hundred, chosen to speak and act in behalf of the rest.

Head-borough also signifies a kind of head constable, where there are several chosen as his assistants, to serve warrants, &c. See **CONSTABLE**.

BOROUGHBRIDGE, a town in the north riding of Yorkshire in England, seated on the river Your, over which there is a handsome stone bridge. The town is not large, but commodious, and sends two members to parliament. W. Long. 1. 15. N. Lat. 54. 10.

BOROZAL, or the zail of the Ethiopians, a disease epidemic in the countries about the river Senega. It principally affects the pudenda, but is different from the lues venerea. It owes its rise to excessive venery; in the men this distemper is called *asab*, and in women *asbatut*.

BORRACHIO. See **CAUCHOUK**.

BORRAGE. See **ANCHUSA**.

BORRELLISTS, in church-history, a Christian sect in Holland; so deominated from their founder Borrel, a person of great learning in the Hebrew, Greek, and Latin tongues. They reject the use of the sacraments, public prayer, and all other external acts of worship. They assert, that all the Christian churches of the world have degenerated from the pure apostolical doctrines, because they have suffered the word of God, which is infallible, to be expounded, or rather corrupted, by doctors which are not infallible.

They lead a very austere life, and employ a great part of their goods in alms.

BORRICHIVS, one of the most learned men of his age, the son of a Lutheran minister in Denmark, was born in 1626. He applied himself to physic in the university of Copenhagen, and began to practise during a most terrible plague that made great havoc in that city. He travelled: but before his departure, in 1660, he was appointed professor in poetry, botany, and chemistry; and at his return discharged his duties with great alacrity, of which the works he published afford full proof. He was raised to the office of counsellor in the supreme council of justice, in 1686; to that of counsellor of the Royal Chancery, in 1689; and died of the operation for the stone, in 1690. He published, 1. *Lingua pharmacopœum*. 2. *Dissertationes de poeticis Græcis et Latinis*. 3. *De ortu et progressu chemie*; and several other works.

BORROWING AND HIRING, in law, are contracts by which a qualified property may be transferred to the hirer or borrower; in which there is only this difference, that hiring is always for a price or stipend, or additional recompense; borrowing is merely gratuitous. But the law in both cases is the same. They are both contracts, whereby the possession and transient property is transferred for a particular time or use, on condition and agreement to restore the goods so hired or borrowed, as soon as the time is expired, or the use performed, together with the price or stipend (in case of hiring) either expressly agreed upon by the parties, or left to be implied by law, according to the value of the service. By this mutual contract, the hirer or borrower gains a temporary property in the thing hired, accompanied with an implied condition to use it with moderation, and not abuse it; and the owner or lender retains a reversionary interest in the same, and acquires a new property in the price or reward. Thus if a man hires or borrows a horse for a month, he has the possession and a qualified property therein during that period; on the expiration of which his qualified property determines, and the owner becomes (in case of hiring) intitled also to the premium or price for which the horse was hired.

There is one species of this price or reward the most usual of any, but concerning which many good and learned men have in former times very much perplexed themselves and other people, by raising doubts about its legality *in foro conscientie*. That is, when money is lent on a contract to receive not only the principal sum again, but also an increase by way of compensation for the use, which is generally called *interest* by those who think it lawful, and *usury* by those who do not so. But as to this, see the article **INTEREST**.

BORROWSTONESS. See **BURROWSTONESS**.

BORZONI (Luciano), a Genoese historian and portrait-painter of great genius and abilities, flourished about the middle of the 17th century. His three sons were professors of the same art: but only one, Francis Maria, succeeded; and that was in sea-pieces, particularly storms.

BOS (John Baptist du), a celebrated author and member of the French academy, was born at Beauvais in 1670, and finished his studies at the Sorbonne. In 1695, he was made one of the committee for foreign affairs under Mr Toren; and was afterwards charged with

Borrichius
Bos.

with some important transactions in England, Germany, Holland, and Italy. At his return to Paris, he was handsomely preferred, made an abbé, and chosen perpetual secretary of the French academy. He was the author of several excellent works; the principal of which are, 1. Critical reflections upon poetry and painting, 3 vols 12mo. 2. The history of the four Gordians, confirmed and illustrated by medals. 3. A critical history of the establishment of the French monarchy among the Gauls, 2 vols 4to, 4 vols 12mo. He died at Paris, on the 23^d of March 1742.

BOS, in zoology, a genus of quadrupeds belonging to the order of pecora. The characters of this genus are taken from the horns and teeth. The horns are hollow within; and turned forward, in the form of crescents: There are eight fore-teeth in the under jaw, and none in the upper, their place being supplied by a hard membrane; and there are no dog-teeth in either jaw. Linæus enumerates six species, viz.

1. The **TAURUS**, including the bull and cow, has cylindrical horns bent outwards, and loose dewlaps. The bull, or male, is naturally a fierce and terrible animal. When the cows are in season, he is perfectly ungovernable, and often altogether furious. When chafed, he has an air of fullen majesty, and oft tears up the ground with his feet and horns. The principal use of the bull is to propagate the species; although he might be trained to labour, his obedience cannot be depended on. A bull, like a stallion, should be the most handsome of his species. He should be large, well-made, and in good heart; he should have a black eye, a fierce aspect, but an open front; a short head; thick, short, and blackish horns, and long shaggy ears; a short and straight nose, large and full breast and shoulders, thick and fleshy neck, firm reins, a straight back, thick fleshy legs, and a long tail well covered with hair. Castration remarkably softens the nature of this animal; it destroys all his fire and impetuosity, and renders him mild and tractable, without diminishing his strength; on the contrary, after this operation, his weight is increased, and he becomes fitter for the purposes of plowing, &c.

The best time for castrating bulls is at the age of puberty, or when they are 18 months or two years old; when performed sooner, they often die. However, it is not uncommon to castrate calves a few days after birth. But such as survive an operation so dangerous to their tender age, generally grow larger and fatter, and have more courage and activity than those who are castrated at the age of puberty. When the operation is delayed till the age of six, seven, or eight years, they lose but few of the qualities of bulls; are much more furious and untractable than other oxen; and when the cows are in season, they go in quest of them with their usual ardor.

The females of all those species of animals which we keep in flocks, and whose increase is the principal object, are much more useful than the males. The cow produces milk, butter, cheese, &c. which are principal articles in our food, and besides answer many useful purposes in various arts.

Cows are generally in season, and receive the bull, from the beginning of May to the middle of July. Their time of gestation is nine months, which naturally brings the veal or calves to our markets from the beginning of

January to the end of April. However, luxury has fallen upon methods of interrupting this natural course, and veal may be had almost every month in the year.

Cows, when improperly managed, are very subject to abortion. In the time of gestation, therefore, they ought to be observed with more than ordinary care, lest they should leap ditches, &c. Neither should they be suffered to draw in the plough or other carriage, which is a practice in some countries. They should be put into the best pasture, and should not be milked for six weeks or two months before they bring forth their young. The calf should be allowed to suck and follow its mother during the first six or eight days. After this it begins to eat pretty well, and two or three weeks in a day will be sufficient. But if the object be to have it quickly fattened for the market, a few raw eggs every day, with boiled milk, and a little bread, will make it excellent veal in four or five weeks. This management of calves applies only to such as are designed for the butcher. When they are intended to be nourished and brought up, they ought to have at least two months suck; because the longer they suck, they grow the stronger and larger. Those that are brought forth in April, May, or June, are the most proper for this purpose; when calved later in the season, they do not acquire sufficient strength to support them during the winter.

The cow comes to the age of puberty in 18 months, but the bull requires two years: but although they are capable of propagating at these ages, it is better to restrain them till they be full three years. From three to nine years those animals are in full vigour; but when older, they are fit for nothing but to be fed for the butcher. A milk-cow ought to be chosen young, fleshy, and with a brisk eye.

The heaviest and most bulky animals neither sleep so profoundly, nor so long, as the smaller ones. The sleep of the ox is short and slight; he wakes at the least noise. He lies generally on the left side, and the kidney of that side is always larger than the other. There is great variety in the colour of oxen. A reddish or black colour is most esteemed. The hair should be glossy, thick, and soft; for, when otherwise, the animal is either not in health, or has a weakly constitution. The best time for inuring them to labour is at the age of two and a half or three years.

The ox eats very quick, and soon fills his first stomach; after which he lies down to ruminate, or chew the cud. The first and second stomachs are continuations of the same bag, and very capacious. After the grafs has been chewed over again, it is reduced to a kind of mash, not unlike boiled spinage; and under this form it is sent down to the third stomach, where it remains and digests for some time; but the digestion is not fully completed till it comes to the fourth stomach, from which it is thrown down to the guts. The contents of the first and second stomachs are a collection of grafs and other vegetables roughly macerated; a fermentation however soon commences, which makes the grafs swell. The communication between the second and third stomach is by an opening much smaller than the gullet, and not sufficient for the passage of the food in this state. Whenever, then, the two first stomachs are defended with food, they begin to contract, or rather perform a kind of re-action. This re-action

*Synopsis of
Quadrupeds.*

*Buffon, Hist.
Naturelle.*

* History of
London
preserved in
Leland's
itin. VIII.

Frequent mention is made of our savage cattle by historians. One relates that Robert Bruce was (in chasing these animals) prevailed from the rage of a wild bull by the intrepidity of one of his courtiers, from which he and his lineage acquired the name of *Turn-bull*. Fitz-Sтивен * names these animals (*uri fiores*) among those that harboured in the great forest that in his time lay adjacent to London. Another enumerates, among the provisions at the great feast of Nevil archbishop of York, six wild bulls; and Sibbald assures us, that in his days a wild and white species was found in the mountains of Scotland, but, agreeing in form with the common sort. These were probably the same with the *bifontes jubati* of Pliny, found then in Germany, and might have been common to the continent and our island: the loss of their savage vigour by confinement might occasion some change in the external

Ros.

ternal appearance, as is frequent with wild animals deprived of liberty; and to that we may ascribe their loss of mane. The urus of the Hercynian forest described by Cæsar, (*lib. vi.*) was of this kind; the same which is called by the modern Germans, *aurachs*, i. e. *bos sylvestris*.

The ox is the only horned animal in these islands that will apply his strength to the service of mankind. It is now generally allowed, that, in the draught, oxen are in many cases more profitable than horses; their food, harness, and shoes, being cheaper; and should they be lamed or grow old, an old working beast will be as good meat, and fatten as well, as a young one.

There is scarce any part of this animal without its use. The blood, fat, marrow, hide, hair, horns, hoofs, milk, cream, butter, cheese, whey, urine, liver, gall, spleen, bones, and dung, have each their particular use in manufactures, commerce, and medicine.

The skin has been of great use in all ages. The ancient Britons, before they knew a better method, built their boats with osiers, and covered them with the hides of bulls, which served them for short coasting voyages.

Primum cana felix madefacto vinum parum

Textur in puppim, cæque induta iuventa;

Veitosis pudent, tumidum super emicat antrum;

Sic Venetus flagrantè Pado, fuscæque Britannus

Navigat oceanum.

LUCAſ, lib. iv. 131.

The bending willow into barks they twine;

Then line the work with spoils of slaughter'd kine.

Such are the floats Venetian fishers know,

When in dull marshes stands the settling Po;

On such to neighb'ring Gaul, allur'd by gain,

The holder Britons cross the swelling main. ROWE.

Vessels of this kind are still in use on the Irish lakes; and on the Dee and Severn: In Ireland they are called *curachs*, in English *coracles*; from the British *cawragh*, a word signifying a boat of that structure. At present, the hide, when tanned and curried, serves for boots, shoes, and numberless other conveniences of life.—

Vellum is made of the thinnest calves-skins, and the skins of abortions. Of the horns are made combs, boxes, handles for knives, and drinking vessels; and when softened by water, obeying the manufacturer's hands, they form pellucid laminæ for the sides of lanterns.

These last conveniences were invented by the great king Alfred, who first used them to preserve his candle time-measurers from the wind; or (as other writers will have it) the tapers that were set up before the reliques in the miserable tattered churches of that time. The very smallest fragments, and even the dust and filings, of horn, are found very serviceable in marring cold lands. The matter lying within, on which the horn is formed, is called the *slough*; and, when dry, is used in making walls or fences, in which, covered from wet, it will last a long time. It is also most admirable in mending roads, where the soil is soft and spewy; for, dissolving, it becomes a glutinous substance, that binds amazingly with gravel. As a manure, they allow between two and three quarter-sacks to an acre. Horn saw-dust with mould is an excellent compost for flowers. It is also of use in hardening, and giving what is called a proper temper, to metals.

In medicine, horns were employed as alexipharmics, or antidotes against poison, the plague, or the small-pox; they have been dignified with the title of *English bazaar*, and are said to have been found to answer the end of the oriental kind.

The teguments, cartilages, and gristles, for the indifferent,—and, for the finer, all the cuttings, parings, and scraps of hides,—are boiled in water, till the gelatinous parts of them are thoroughly dissolved; and the mass, properly dried, becomes glue. See GLUE.

The bones are used by mechanics where ivory is too expensive; by which the common people are served with many neat conveniences at an easy rate. From the tibia and carpus bones is procured an oil much used by coach-makers and others in dressing and cleaning harness, and all trappings belonging to a coach; and the bones calcined afford a fit matter for telfers for the use of the refiner in the smelting trade.

The blood is used as an excellent manure for fruit-trees, and is the basis of that fine colour the Prussian blue.

The sinews are prepared so as to become a kind of thread or small cord, used in sewing saddles, in making racquets, and other things of a like nature.

The hair hath also its value, and is employed in many different ways. The long hair of the tail is frequently mixed with horse-hair spun into ropes, and sometimes wove. The short hair serves to stuff saddles, seats of several kinds, mattresses, and chairs. The refuse is a good manure, and operates more speedily than the horns.

The fat, tallow, and suet, furnish us with light; and are also used to precipitate the salt that is drawn from briny springs. The gall, liver, spleen, and urine, had also their place in the materia medica, though they have now resigned it to more efficacious and agreeable medicines.

The uses of butter, cheese, cream, and milk, in domestic œconomy, and the excellence of the latter in furnishing a palatable nutriment for most people whose organs of digestion are weakened, are too obvious to be insisted on.

2. The BONASUS has a long mane; its horns are bent round towards the cheek, and are not above a span long. It is about the size of a large bull, and is a native of Africa and Asia. When enraged, he throws out his dung upon dogs or other animals that annoy him; the dung has a kind of caustic quality, which burns the hair off any animal it falls upon.

3. The BISON has likewise a long thick mane, which covers the whole neck and breast on each side. The horns are turned upwards, and exceedingly large; there is a large protuberance or bunch on the back; his eyes are red and fiery, which gives him a furious aspect. He is fierce, cruel, and so bold that he fears nothing. It is unsafe to hunt him but where the trees are so large as to hide the hunters. He is a native of Mexico and Florida.

The *musk-ox* of Hudſon's bay, a variety of this species, wants the hump between the shoulders. It is about the size of a Scotch bullock; has a thick body, and short legs. The horns are large, and very remarkable: they are united at their origin in the skull; but immediately after, they fall down on each side of the crown of the head, then taper away small, the points turning up. The hair is black, and grows to a great length; underneath which is a fine wool superior to Vigonia wool. The male only has the curious scalp; the female is covered with hair. These animals frequent the country about 100 miles inwards to the north-west of Churchill river, in Hudſon's bay, where they are very

Ros.

Campbell's
Political
Survey.

Bos.

numerous. The Indians kill great numbers of them : but the flesh is coarse eating ; and so musky tasted at certain seasons, as not to be eatable. From 2000 to 4000 weight of the flesh frozen, is brought to Prince of Wales's fort annually, and is served out as provisions to the Europeans.

A specimen of the head of this animal is now in Edinburgh, in the possession of Mr. Graham from Hudson's bay. A figure of it is given in Plate LXV.

4. The GRUNNIERS, or hog-cow, has cylindrical horns bent backwards. The body is so hairy, that the hair hangs down upon its knees like a goat. The colour of the body is black, but the front is white. It has bristles on its back, tail, and hind-legs, and it grunts like an hog. It is an inhabitant of the north of Asia.

† Pl. LVIII. A variety of this species is the *Indian ox*, with a vast hump on the shoulders. They differ much in size, and in the form of their horns. Some are very large, and of a reddish colour ; with horns short, and bending close to the neck : others very small, with horns almost upright, bending a little forward. In Surat, is a minute kind not bigger than a great dog, which have a very fierce look, and are used to draw children in small carts. In Celebes is a small species not bigger than a middle-sized sheep, called *Anoa*, very fierce and wild, of a dark ash-colour, inhabiting the rocks. Mr. Loten, when in India, put some of them into a paddock, and in one night's time they killed 14 or 15 of his deer by ripping up their bellies.

5. The BUBALIS, or buffalo, has large black horns bent backward and inward, and plain before. The hair on the back is very hard, but thinly scattered over the body. It is a native of Asia. But they are tamed in Italy, and used for the same purposes as black cattle in other countries. They draw carriages, and are guided by a rope tied to a string thrust through their noses. The buffalo is larger than an ox, has a thicker body, and a very hard hide. His pace is slow ; but he will carry a great burden. They feed in herds like cows ; and yield plenty of milk, of which very good butter and cheese is made. Their flesh is pretty good, but not to be compared to beef. The wild buffalo is a very fierce and dangerous animal ; he often attacks travellers, and tears them in pieces. However, they are not so much to be feared in woods as in the plains, because their horns, which are sometimes ten feet long, are apt to be entangled in the branches of trees, which gives those who are surprised by them time to escape. They are excellent swimmers, and will cross the largest rivers without any difficulty. They run wild in great troops on the coast of Malabar ; for which reason strangers are allowed to hunt and kill them at pleasure.

6. The INDICUS, or little Indian buffalo, has horns shorter than its ears, a bunch on its back, and no mane. It is about the size of a calf six months old, and used in the East Indies for drawing coaches.

BOS, in antiquity, was peculiarly used for an ancient Greek silver coin, which was *didrachmus*, or equivalent to two drachms. It was so called as having on it the impression of an ox, and chiefly obtained among the Athenians and Delians ; being sometimes also struck of gold. From this arose the phrase *Bos in lingua*, applied to those who had taken bribes to hold their tongue.

BOSA, a maritime town in the western part of the

island of Sardinia, with a castle, a good port, and a bishop's see. It is seated on the river Bofa, to the north-east of an island of the same name ; and has good salt pits. E. Long. 8. 30. N. Lat. 40. 19.

BOSCAGE, the same with a grove, or thicket. Boscage, in a law sense, is that food which trees yield to cattle ; as mast, &c. But Manwood says, to be quit of boscage is to be discharged of paying any duty for windfall wood in the forest.

BOSCAGE, among painters, denotes a landscape representing much wood and trees.

BOSCAN (John), a Spanish poet of the 16th century, born at Barcelona. He was the friend of Garcilasso de Vega, another Spanish poet. These two were the first who made any great improvement in the poetry of their nation, and their pieces were printed together. Boscan, who died about the year 1542, principally succeeded in sonnets.

BOSCAWEN (Edward), a brave British admiral, was the second son of Hugh late lord viscount Falmouth. Having early entered into the navy, he was, in 1740, captain of the *Shoreham* ; and behaved with great intrepidity as a volunteer under admiral Vernon, at the taking of Porto Bello. At the siege of Carthagenia, in March 1740-1, he had the command of a party of seamen who resolutely attacked and took a battery of 15 twenty-four pounders, though exposed to the fire of another fort of five guns. Lord Aubrey Beauclerk being killed at the attack of Boca-Chica, captain Boscawen succeeded him in the command of the prince Frederic of 70 guns. In May 1742, he returned to England, and married Frances daughter of William Glanville, Esq ; and the same year was elected representative for Truro in Cornwall. In 1744, he was made captain of the *Dreadnought* of 60 guns ; and soon after he took the *Medea*, a French man of war commanded by M. Hoquart, the first king's ship taken in that war. May 3^d, 1747, he signaled himself under the admirals Anson and Warren, in an engagement with the French fleet off Cape Finisterre, and was wounded in the shoulder with a musket ball. Here M. Hoquart, who then commanded the *Diamont* of 56 guns, again became his prisoner ; and all the French ships of war, which were ten in number, were taken. On the 15th of July, he was made rear-admiral of the blue, and commander in chief of the land and sea forces employed on an expedition to the East Indies ; and on the 4th of November, sailed from St. Helens, with six ships of the line, five frigates, and 2000 soldiers. On the 29th of July 1748, he arrived at St. David's, and soon after laid siege to Pondicherry ; but the men growing sickly, and the monsoons being expected, the siege was raised, and Mr. Boscawen shewed himself as much the general as the admiral in his retreat. Soon after he had news of the peace, and Madras was delivered up to him by the French. In April 1750, he arrived at St. Helens in the *Exeter*, and found that in his absence he had been appointed rear-admiral of the white. He was the next year made one of the lords commissioners of the admiralty, and chosen an elder brother of the trinity-house. In February 1755, he was appointed vice-admiral of the blue. On the 16th of April, failing in order to intercept a French squadron bound to North America, he fell in with the *Alcide* and *Lys* of 64 guns each, which were both taken :

Bosage
||
Boscawen.

*Fig. 2. Bos Indicus
or Great Indian Ox.*



*Fig. 3. BREAD Fruit!
near its natural size.*



Fig. 1. BOA Constricor.





Boswen
Bosca.

taken : on this occasion M. Hoquart became his prisoner a third time, and he returned to Spithead with his prizes and 1500 prisoners. In 1756, he was appointed vice-admiral of the white ; and in 1758, admiral of the blue, and commander in chief of the expedition to Cape Breton ; when, in conjunction with general Amherst, and a body of troops from New England, the important fortrefs of Louisbourg and the whole island of Cape Breton was taken, for which he afterwards received the thanks of the House of Commons. In 1759, being appointed to command in the Mediterranean, he arrived at Gibraltar, where hearing that the Toulon fleet, under M. de la Clue, had passed the Straights, in order to join that at Brest, he got under fail, and on the 18th of August, saw, pursued, and engaged the enemy. His ship, the *Namur*, of 90 guns, losing her main-mast, he shifted his flag to the *Newark* ; and, after a sharp engagement, took three large ships, and burnt two in Lagos bay, and the same year arrived at Spithead with his prizes and 2000 prisoners. On December 8th 1760, he was appointed general of the marines, with a salary of L. 3000 *per annum*, and was also sworn one of the privy-council. He died in 1761.

BOSCHAERTS (Thomas Vuillebos), a celebrated painter, was born at Bergen-op-zoom ; and, like the great painters who flourished at that time, began to draw, when very young, in the books that were intended for other studies. Preferring his pencil to every thing else, he drew his own picture, by his resemblance in a looking-glass, so like, that those who saw it were astonished. This he did before he had the least instruction from any one, and when he was only 12 years of age. Upon this, his parents sent him to a master, that he might follow the bent of his genius ; but his first master being only an indifferent painter, and incapable of satisfying his earnest desire of learning, he left him, and engaged himself with Gerard Segers, under whom, after four years practice, he proved a most accomplished artist. Antwerp being at that time the seat of arts, where there was a conflux of the most eminent painters, he thought it the fittest place for his improvement ; and there executed such a number of noble pieces as added greatly to the splendour of that wealthy city. In 1642, Henry Frederick prince of Orange, and his son prince William, employed him in their service ; in which he continued several years, and made those excellent pieces that are to be seen in that prince's palace at the Hague, and other parts of Holland, and painted portraits for most of the persons of quality that were then living. He died in the flower of his age, in 1670.

BOSCO, or BOSCHI, a town of Italy, in the Milanese, seated on the river Orbe. E. Long. 9. 44. N. Lat. 44. 53.

BOSEA, GOLDEN-ROD TREE ; a genus of the digynia order, belonging to the pentandria class of plants. Of this genus there is but one species, viz. the *yervamora*. This is a native of the Canary islands, and also some of the Caribbees. It hath been long an inhabitant of the British botanic gardens, but hath never been observed to flower in this country. It is a pretty strong woody shrub, growing with a stem as large as a middling person's leg ; the branches come out very irregular, and make considerable shoots every summer, which should be shortened in the spring. These branches

retain their leaves till towards the spring, when they fall away, and new leaves are produced in their place. It may be propagated by cuttings planted in the spring ; and the plants must be housed in winter, for they are too tender to bear the open air at that season of the year.

BOSNA-SERAGO, a large and strong town of Turkey in Europe, and capital of the province of Bosnia. E. Long. 18. 57. N. Lat. 44. 40.

BOSNIA, a province of Turkey in Europe, seated between Slavonia and Dalmatia. It belongs entirely to the Turks ; but they were on the point of being expelled from it by the Christians, when the Spaniards invaded Sicily, and obliged the emperor to conclude the peace of Passarowitz in 1718, by which he gave up Bosnia to the Turks. It is 200 miles in length, and 75 in breadth. It is a barren country, and but little cultivated ; the principal revenue arising chiefly from the silver mines. Among the game there are falcons, which are held in great esteem.

BOSPHORUS, in geography, denotes, in general, a narrow sea, or channel, separating two continents, and serving as a communication between two seas.

BOSPHORUS is more particularly used for the straits of Constantinople, which divide Europe from Asia. This was the original *Bosphorus*, so called because oxen could swim over it ; and from the resemblance between it and the straits of Kassa, these last were anciently called the *Gimmerian*, and the former the *Thracian*, *Bosphorus*. This strait, which is the communication between the Black sea and that of Marmora, is about 20 miles in length, and a mile and a quarter in breadth where it is narrowest. The Turks have built two castles over against each other to defend the passage. The country about it is very pleasant : on one side stands Constantinople ; and on the other Scutari, where the Grand Signior has a palace, and is looked upon as a suburb to Constantinople. The entrance of this strait is dangerous, and sometimes fatal to vessels.

BOSQUETS, in gardening, groves so called from *boschetto*, an Italian word which signifies a *little wood*. They are compartments in gardens formed by branches of trees disposed either regularly in rows, or wildly and irregularly, according to the fancy of the owner. A bosquet is either a plot of ground inclosed with palisades of hornbeam, the middle of it being filled with tall trees, as elm or the like, the tops of which make a tuft or plume ; or it consists of only high trees, as horse-chestnut, elm, &c. The ground should be kept very smooth and rolled, or else covered with grass, after the manner of green plots. In planting bosquets, care should be taken to mix the trees which produce their leaves of different shapes, and various shades of green, and hoary or mealy leaves, so as to afford an agreeable prospect. Bosquets are only proper for spacious gardens, and require a great expence to keep them up.

BOSSAGE, in architecture, a term used for any stone that has a projecture, and is laid rough in a building, to be afterwards carved into mouldings, capitals, coats of arms, &c. Bossage is also that which is otherwise called *ruffic work* ; and consists of stones which advance beyond the naked, or level, of the building, by reason of indentures or channels left in the joinings. These are chiefly used in the corners of edifices, and thence called *ruffic quoins*. The cavities or indentures

Bosna
Bossage.

are sometimes round, sometimes chain-framed, or bevelled, sometimes in a diamond form, sometimes inclosed with a cavetto, and sometimes with a listel.

BOSSE (Abraham), an able engraver, born at Tours, was well skilled in perspective and architecture. He wrote two treatises, which are esteemed; the one on the manner of designing, and the other upon engraving.

BOSSINEY, or **BOSS-CASTLE**, a town of Cornwall, in England, which sends two members to parliament. W. Long. 5. o. N. Lat. 50. 40.

BOSSU (Rene le), born at Paris in 1631, was admitted a canon regular in the abbey of St Genevieve, in 1649; and after a year's probation, took the habit. He taught polite literature with great success in several religious houses for 12 years, when he gave up the task for retirement. He then published a parallel betwixt the principles of Aristotle's natural philosophy and those of Des Cartes, with a view to reconcile them; which was but indifferently received. His next treatise was on epic poetry; which Boileau declared one of the best compositions on that subject in the French language, and which produced a great friendship between them. He died in 1680, and left a great number of MSS. which are kept in the abbey of St John de Chartres.

BOSSUET (James Benigne), bishop of Meaux, was born at Dijon, on the 27th of September, 1627. He distinguished himself by his preaching, and the zeal he discovered in his endeavours to bring over the Protestants of France to the Romish church; by his opposition to Quietism; and by his numerous writings both in French and Latin, which have been collected together, and printed at Paris in 17 vols 4to. This famous divine died at Paris, in 1704, aged 77.

BOSSUPT, a town of the Austrian Netherlands, in the province of Brabant. E. Long. 4. 30. N. Lat. 50. 52.

BOSSUT (Matthew), distinguished by his virtue and his learning, was born in 1427. He devoted himself to the ecclesiastical state in 1451, in the congregation of regular canons of Lateran, and afterwards taught divinity at Padua. His orations, his sermons, and his letters, have been often printed. He also wrote a sort of an apology for Phalaris, and other works. He died at Padua in 1502, aged 75.

BOST, a very strong town of Persia, and capital of the province of Zablestan. E. Long. 64. 15. N. Lat. 31. 50.

BOSTANGIS, in the Turkish affairs, persons employed in the garden of the seraglio, out of whose number are collected those that are to row in the Grand Signior's brigantines, when he has a mind to divert himself with fishing, or to take the air upon the canal. They who row on the left hand are only capable of mean employments in the gardens: but they who row on the right hand may be promoted to the charge of *bostangi-bachi*, who has the general intendency of all the Grand Signior's gardens, and commands above 10,000 *bostangis*.

BOSTON, a corporation-town of Lincolnshire in England, which sends two members to parliament. It is commodiously seated on both sides the river Witham, over which it has a handsome, high, wooden bridge; and, being near the sea, enjoys a good trade. It has a spacious market-place, and the largest parish

church without cross-issles in Europe, the steeple of which serves for a land-mark to sailors. E. Long. o. 15. N. Lat. 53. 3.

BOSTON, the capital of New England in North America, built in 1630, in a peninsula of about four miles in circumference, at the bottom of Massachusetts bay, in a very convenient situation for trade. The following is a description of this capital before the commencement of the present American war. "The town stands in W. Long. 71. 5. N. Lat. 42. 24. about nine miles from the mouth of the bay. At the entrance of this bay are several small rocks which appear above water, and upwards of a dozen of small islands, some of which are inhabited. There is but one safe channel to approach the harbour; and that so narrow, that two ships can hardly sail through abreast; but within the harbour, there is room for 500 sail to lie at anchor in a good depth of water. On one of the islands of the bay stands Fort William, the most regular fortrefs in British America. This castle is defended by 100 guns, 20 of which lie on a platform level with the water, so that it is scarce possible for an enemy to pass the castle. To prevent surprise, they have a guard placed on one of the rocks, at two leagues distance, from whence they make signals to the castle when any ships come near it. There is also a battery of guns at each end of the town. At the bottom of the bay is a noble pier near 2000 feet in length; along which on the north side extends a row of warehouses for the merchants; and to this pier, ships of the greatest burden may come and unload, without the help of boats. The greatest part of the town lies round the harbour in the form of a half moon, the country beyond it rising gradually and affording a delightful prospect. The neck of land which joins the peninsula to the continent is but 40 yards over; which situation, if properly improved, might render the town impregnable on the land side. Boston contains only about 18,000 inhabitants. They were more numerous 50 years ago; but the surprising increase of Newbury-port, Salem, Marble-head, Cape Ann, Plymouth, Dartmouth, and the island of Nantucket, checked the growth and trade of the capital. The trade of Boston, however, was so considerable, that, in 1768, 1200 sail entered and cleared at the custom-house there. The predominant religion is the Independent; though there are other persuasions, and ten churches serve for them all, but the Independents have six." Boston has frequently suffered by fire, but the houses that were thus destroyed have always been rebuilt to advantage.

BOSWORTH, a town of Leicestershire in England, situated in W. Long. 1. 24. N. Lat. 52. 45.—It has a lofty situation on a hill, and the country about it is fertile in corn and grafs. It is memorable for the decisive battle fought near it between Richard III. and Henry earl of Richmond, wherein the former lost his crown and life.

BOTALLUS, (Leonard), physician to the duke of Alencon, and to Henry III. was born at Asti in Piedmont. He introduced at Paris the practice of frequent letting of blood; which was condemned by the faculty; but soon after his death it came into practice with all the physicians. He published several books in physic and surgery; the best edition of which is that of Leyden in 1660, octavo.

B O T A N Y,

IN the utmost extent of the word, signifies a knowledge of plants, and of the uses to which they may be applied, either in medicine, chemistry, or in the different arts.—But as the medical virtues of plants fall properly under the province of the physician, their chemical properties belong to the chemist, &c.; hence the science of botany is commonly restricted to a bare knowledge of the different plants themselves, and of the distinguishing marks whereby each individual species may be known from every other. This knowledge is indispensably necessary for those who propose to apply plants to any useful purpose: for example, though we should suppose a physician ever so well acquainted with the virtues of opium, and a chemist ever so well acquainted with the method of preparing it, yet if both of them were entirely ignorant of botany, so as to be unable to distinguish the particular species of poppy which produces opium from others of the same genus, 'tis evident their medicinal and chemical skill could be of no use.

The utility of botanical classifications may be further illustrated from the following considerations.

1. With regard to *Food*. Many animals are endowed with an instinctive faculty of distinguishing with certainty whether the food presented to them be salutary or noxious. Mankind have no such instinct. They must have recourse to experience and observation. But these are not sufficient to guide us in every case. The traveller is often allured by the agreeableness of smell and taste to eat poisonous fruits. Neither will a general caution not to eat any thing but what we know from experience to be salutary, answer in every emergency. A ship's company, in want of provisions, may be thrown upon an uninhabited coast or a desert island. Totally ignorant of the nature of the plants they meet with, diseases, or scarcity of animals, may make it absolutely necessary to use vegetable food. The consequence is dreadful: they must first eat before any certain conclusion can be formed. This is not the description of danger arising from an imaginary situation. Before the vegetables that grow in America, the East and West Indies, &c. became familiar to our sailors, many lives were lost by trials of this kind: neither has all the information received from experience been sufficient to prevent individuals from still falling a prey to ignorance or rashness.—If the whole science of botany were as complete as some of its branches, very little skill in it would be sufficient to guard us infallibly from committing such fatal mistakes. There are certain orders and classes which are called *natural*, because every genus and species comprehended under them are not only distinguished by the same characteristic marks, but likewise possess the same qualities, though not in an equal degree. For example: Shew a botanist the flower of a plant whose calix is a double valved glume, with three stamina, two pistils, and one naked seed; he can pronounce with absolute certainty, that the plant from which the flower was taken, bears seeds of a farinaceous quality, and that they may be safely used as food. In like manner, shew him a flower with 12 or more stamina all inserted into the internal side of the calix, tho'

it belonged to a plant growing in Japan, he can pronounce without hesitation, that the fruit of it may be eat with safety. On the other hand, shew him a plant whose flower has five stamina, one pistil, one petal, or flower-leaf, and whose fruit is of the berry kind, he will tell you to abstain from it, because it is poisonous. Facts of this kind render botany not only a respectable, but a most interesting, science.

2. With respect to *Medicine*, the same thing holds good. It is found by experience, that plants which are distinguished by the same characters in the flower and fruit, have the same qualities, though not always in an equal degree as to strength or weakness; so that, upon inspection *a priori* the effects that will result when taken into the stomach. In order, therefore, to determine the medical virtues of all the plants belonging to a natural class, the physician has nothing to do but to ascertain by a set of clear and unquestionable experiments, the virtues of any one of them. This greatly shortens the labour of investigation. Supposing the number of known species to be 20,000; by ascertaining the virtues of one genus, at a medium, you determine the virtues of 12 species. But by ascertaining the virtues of one genus belonging to a natural order, the virtues of perhaps 300 or 400 species are ascertained.

SECT. I. History of Botany.

THE origin of this science, like that of most others, cannot be found out from the most ancient histories; but it is very probable, that some degree of botanical knowledge has existed in every age of the world. The first botanical writings of which we have any account are those of Solomon, who we are informed by scripture did write a treatise upon this subject; but that is absolutely lost, not being quoted by any ancient author, nor the least fragment of the treatise itself remaining. Among the Greeks, Anaxagoras, Pythagoras, and other ancient philosophers, wrote treatises on plants; but their works are also lost; and from the quotations that yet remain in the works of Theophrastus, Dioscorides, and Pliny, we learn, that those first botanical writings could convey but very little knowledge.

The historical era of botany, therefore, commences with Theophrastus the disciple of Aristotle. He was born at Eresium, in the island of Lesbos; and flourished in the third century before the Christian era, being about 100 years posterior to Hippocrates. His work is entitled *The History of Plants*, and treats of their origin, propagation, anatomy, and construction; of vegetable life, and of vegetation. It consisted originally of ten books; but of these only nine are now extant. In these, vegetables are distributed into seven classes or primary divisions; which have for their object, the generation of plants; their place of growth; their size as trees and shrubs; their use as pot herbs and esculent grains; and their lactescence, or the liquor of whatever colour, that flows from plants when cut. In his work, about 500 different plants are described.

The next botanist of any note was Dioscorides, a Grecian by birth, but under the Roman empire, being
near

near 400 years posterior to Theophrastus. He describes about 600 plants; and these he has arranged, from their uses in medicine and domestic economy, into four classes, which are thus designated: aromatics; alimentary vegetables, or such as serve for food; medicinal, and vinous plants.

Almost cotemporary with Dioscorides flourished Antonius Musa, Cato, Varro, Virgil, and Columella; the first, author of a treatise still extant on the plant *botany*; the four others celebrated for their useful tracts on agriculture and rural economy.

Pliny the Elder, in his voluminous work intitled *The History of the World*, hath a botanical part which is contained in 15 books. In these, besides the plants of Theophrastus and Dioscorides, he has given descriptions of several new species, extracted probably from works which would otherwise have been totally lost. Pliny uses scarce any mode of arrangement, except the ancient, but very incorrect, distinction into trees, shrubs, and herbs. His plan, however, extends not only to botanical distinctions, but to gardening, agriculture, and whatever is connected either more nearly or remotely with the science of plants. He gives descriptions of above 1000 different species; but from the want of a proper systematic arrangement, it is often difficult, and perhaps impossible, to determine what plants he or other ancient botanists do really describe.

This want of precision in properly arranging their plants was the reason why the botany of the ancients was always very limited, and after the time of Pliny declined so rapidly. On the destruction of the western empire by the Goths and other barbarous nations, it is not to be thought that botany could survive any more than the other sciences. It was not till near the close of the eighth century, that the ancient botany began again to appear in Arabia. Serapion, well known in medicine, stands first in the Arabian catalogue of botanists; to him succeeded Rasis, Avicenna, Averrhoes, Actuarius, &c. An author known by the name of *Plato Apuleius*, or *Apollonius*, of whose *herbarium* very old manuscript copies are preserved in some curious libraries, is supposed to have lived near this period. The works of most of these botanists, however, were only translations and compilations from the Greek writers; so that, for want of a proper systematic arrangement, the science sunk a second time into total oblivion. For near 400 years after Abengueis, an Arabian physician who flourished in the end of the 12th century, scarce any attempts were made in the botanical way. Some obscure writers indeed appeared in several parts of Europe; as, Arnoldus de Villa Nova; Platearius; Matthæus Sylvaticus; and Bartholomew Glanvil, commonly called *Bartholomew Anglus*, a Franciscan monk, descended of the family of the earls of Suffolk, who lived in the reign of King Edward III. and wrote a book of natural history, intitled *De proprietatibus rerum*, which was translated into English by John de Trevisa in 1398: but though all these wrote of plants, they were so totally destitute of method, that their works remain one great chaos, from whence it is impossible to extract any thing.

On the revival of letters in the beginning of the 16th century, the botany of the ancients was restored a second time. The Greek writings were translated into Latin, the common language of Europe. Gaza, a

Greek refugee at Rome, made elegant translations of Aristotle and Theophrastus, who afterwards were commented upon by Scaliger and Stapel. Dioscorides was also translated and commented on. His best commentators are Hermolaus Barbarus, Fuchsius, Ruellus Cordus, Gesner, and Matthioli. The most distinguished commentators of Pliny are Dalechamp in 1604, Salmasius in 1689, Harduin, and Guilandinus. Meurcius and Ursinus have written commentaries upon Cato; Campegius and Monardes upon Mesue the Arabian, and Lonicer upon Avicenna. This last hath been translated by several writers, particularly Alpagus, Costæus, and Plempius, into Latin; and by one writer, Amalthæus, into Hebrew.

Hieronymus Bock, or Bouc, a German, generally known by the name of *Tragus*, is the first modern who has given a methodical distribution of vegetables. In 1532, he published a History of Plants, in which he describes 800 species; and these he divides into three classes, founded on the qualities of vegetables, their figure, habit, and size. The same method of arrangement was followed by Lonicer, Dodonæus, L'Obel, Clusius, Brunfelsius, Monardes, Cordus, and some other botanists of this period. How far such a method was deficient, shall be considered in the following section; however, it was not till 1560 that Conrad Gesner first proposed to the world an arrangement of vegetables from the parts of the flower and fruit. He did not establish any plan founded upon this principle; but, having suggested the idea, left the application to be made by others: and in 1582, Dr Andrew Cæsalpinus, physician at Pisa, and afterwards professor of botany at Padua, first availing himself of the ingenuity of his predecessor, proposed a method of arrangement which has the fruit for its basis; and thus gave origin to systematic botany, the second grand era in the history of that science.

Even this improved method of Cæsalpinus was not without very great inconveniences, which shall be taken notice of hereafter. As it was, however, so greatly superior to every thing that had appeared before, it might have been expected that the learned would have immediately adopted it, and that all the former equivocal and insufficient characters would have been rejected. But the fact was otherwise. Cæsalpinus's method of arrangement died with him; and it was not till near a century after, that Dr Robert Morison of Aberdeen, attaching himself to the principles of Gesner and Cæsalpinus, re-established scientific arrangement upon a solid foundation; so that, from being only the restorer of system, he has been generally celebrated as its founder. In the long interval between Cæsalpinus and Morison, flourished some eminent botanists. The most noted are, Dalechamp, author of *A general history of plants*; Theodore, surnamed *Tabernaemontanus*, and Thalius, two German writers; Porta, an Italian, famous for an arrangement of plants from their relations to the stars, to men, and other animals; Prosper Alpinus, author of a Catalogue of the plants of Egypt; Fabius Columna, inventor of many of the botanical terms now used; the two Bauhins; Gerard and Parkinson; Luzizianski, a Pole, author of an arrangement from the qualities and habit of plants; Marggrave and Pifo, celebrated for their *Natural History of Brasil*; Hernandez, equally celebrated for his history of Mexi-

co; Pafſeus, or Du Pas, author of an arrangement of plants from the time of flowering, of all characters the most uncertain and insufficient; Johnston; Bontius, a Dutchman, author of a Natural History of the East Indies; Aldrovandus, the celebrated naturalist; and Rheede, governor of Malabar, and author of the well-known *Hortus Malabaricus*.

The method proposed by Morison has the fruit for its basis, as well as that of Cæsalpinus; to which, however, it is greatly inferior both in the plan and execution. It is indeed of all others the most difficult in practice; and was therefore not adopted by any succeeding writer, except Bobart who in 1699 completed Morison's Universal History of Plants, and an anonymous author whose work appeared in 1720. Imperfect, however, as his method is, it furnished many useful hints, which succeeding botanists have not failed to improve. Ray and Tournefort have owed him much, and are not ashamed to own the obligation. The fame has been done even by Linneus; who hath established the science of botany on the most solid foundation, by introducing a method of arrangement, if not absolutely perfect, at least as nearly approaching to perfection as can be expected; and therefore hath been deservedly followed, in preference to every other, by all botanists, since its first publication. But to give a particular account of all the different botanical systems, with the particular advantages and disadvantages attending each, shall be the business of the subsequent sections.

SECT. II. Of the Ancient Method of arranging Vegetables.

IN giving an account of the works of Theophrastus and Dioscorides, we have already taken notice that the former chose seven distinguishing characters, viz. the generation of plants; their place of growth; their size, as trees and shrubs; their use, as pot-herbs and esculent grains; and their lactescence, or liquor that flows from them when cut. Dioscorides divided them into aromatics, alimentary, medicinal, and vinous plants. The good properties of this method are, that the botanist, as it were, comes to the point at once; and when he knows the plant, knows also its virtues and uses, or at least part of them: but this convenience is greatly overbalanced by innumerable disadvantages; for the qualities and virtues of plants are neither fixed and invariable, nor are they impressed in legible characters on the plants themselves. The different parts of a plant often possess different and even opposite virtues; so that, supposing the virtues to be known, and applied to the purpose of vegetable arrangement, the root must frequently fall under one division, the leaves under a second, and the flower and fruit under a third. Besides, if we reflect that the sole end of such arrangement is to facilitate the knowledge of plants to others, the insufficiency and even absurdity of methods founded upon their virtues will immediately appear. A stalk of vervain, for instance, is presented to me, which I am to investigate from a presupposed knowledge of the virtues of plants. Before I can settle the class to which it belongs, I must discover whether or not it has the virtues belonging to any of the plants I know; and this discovery being the result of repeated experiments on various parts of the human body, may require many years

for its accomplishment.

The same causes which render methods founded on the virtues of plants unfavourable for the purpose of investigation, must evidently disqualify all their other variable qualities and accidents from having a place in a genuine systematic arrangement. The *natale solum* of plants, which is one of Theophrastus's divisions, affords no better distinctive characters than their powers and virtues. Many countries as well as many soils produce the same individual plants. The same species which crown the mountains, frequently cover the fens; and plants which have long been reckoned the peculiar inhabitants of some parts of Asia and America, are now found to grow naturally in equal perfection in the very different climates of Lapland and Siberia. The size of plants, which suggested the ancient division into trees and shrubs, is no less an equivocal mark of distinction than the circumstances already mentioned. The vine, which modern botanists denominate a shrub, was ranged by Theophrastus in his third class containing trees. In fact, every thing respecting size is so much affected by differences of soil, climate, and culture, that the same plant, in different circumstances, shall differ exceedingly in height; and in a method founded upon the size, would sometimes be ranged as a tree, and sometimes as a shrub, or even an under shrub, according as it happens to exceed, equal, or fall short of, a given standard. No less insufficient are characteristical marks drawn from the colour, taste, and smell of plants. Of all the attributes of vegetable nature, colour is perhaps the most inconstant. Heat, climate, culture, soil, &c. contribute to the production of endless diversities of colour, and render the transition from one to another natural and easy. Red and blue pass easily into white, white into purple; yellow into white; red into blue; blue into yellow, &c. In the same leaf or flower, different colours are frequently observed. Variations too in point of colour, are frequently observed to take place not only in different individuals of the same species, but even in similar parts of the same plant. Marvel of Peru and Sweet William produce flowers of different colour upon the same stalk. Objections equally valid lie against characteristical marks drawn from the taste and smell. The former varies in different individuals from differences of age, and even in the same individual at different times, according to the morbid or sound state of the organ. The latter is different in different subjects, and varies in each; nor are the effluvia sent forth from the same body always of equal intensity. In plants, taste is subject to continual variations from differences of climate, soil, and culture. Garlic in some climates, particularly in Greece, is said to lose its rankness: apples and pears, that grow naturally in the woods, are intolerably acid; celery and lettuce, which culture renders sweet and palatable, are in their wild uncultivated state, bitter, disagreeable, and in some cases noxious.

These considerations are abundantly sufficient to shew the imperfection of the ancient system of botany; and indeed, considering the vague and uncertain marks by which they distinguished one plant from another, we may rather wonder how such a science as botany came to have an existence among them, than that they arrived at no greater perfection in it, or suffered it so soon to fall into oblivion.

SECT. III. *Of the different Botanical Systems, from the time of Gesner to that of Linneus.*

THE insufficiency of the ancient botanical system being so fully shewn in the last section, we think it needless to take much notice of the methods used by Tragus and his contemporaries and followers. The virtues of plants being found an insufficient characteristic, succeeding botanists had taken in the root, stem, and leaves; but these being also found insufficient and variable, Gesner turned his eye to the flower and fruit, as being the most permanent and unchangeable parts of the plant. In proposing the parts of fructification, however, as the most proper for arranging plants, he communicated no hints respecting the choice of some of those parts in preference to others. Each particular organ of the flower and fruit furnishes sufficient variety to serve as the foundation of a method; but all of them are not equally proper for this purpose. Cæsalpinus, the first follower of Gesner, made a mistake in his choice, and took his distinguishing characteristics only from the fruit. The parts of the flower, therefore, being employed by the first systematic writers only as subaltern distinctions in finding out orders and genera, it is evident that the plant could not be fully investigated for several months. Suppose a plant ripens its fruit in October, and does not produce flowers till the following May; the class, upon inspection of the fruit in the month of October, is immediately ascertained; but the plant still remains unknown, and will continue so upwards of six months after, if the characters of the order and genus have been made to depend on any part of the flower. Methods founded on the fruit have another inconvenience; plants constantly ripen their fruit in those countries where they grow naturally, but not always in the countries to which they may be accidentally transported. So far from this, many plants that are natives of a warm climate neither ripen, nor form fruit, in a cold one. Few of the African, Asiatic, and West-Indian plants produce fruit in Britain. A method, therefore, founded upon the fruit, could only facilitate the knowledge of such plants to the inhabitants of those countries where they grow: to the English botanist they could be of little or no service. The same objection cannot reasonably be urged against methods founded on the flower, since the influence of climates much colder than that of Britain has not been able to destroy the faculty of producing flowers in many, perhaps in most, of the plants just mentioned.

Cæsalpinus sets out with an ancient distinction of vegetables, from their duration, into trees and herbs. With the former he combines shrubs; with the latter, undershrubs; and distributes his plants into the 15 following classes. 1. Trees with the germ, (radicle or principle of life in the seed) on the point of the seed. 2. Trees with the germ on the base of the seed. 3. Herbs having one seed only. 4. Herbs having two seeds. 5. Herbs having four seeds. 6. Herbs having many seeds. 7. Herbs having one grain or kernel. 8. Herbs having one capsule. 9. Herbs having two capsules. 10. Herbs having fibrous roots. 11. Herbs having bulbous roots. 12. Herbs having succory or endive-like flowers. 13. Herbs having a common flower. 14. Herbs having several follicles or seed-bags.

15. Herbs having neither flower nor seed.

The inconveniences of this method have been already pointed out pretty fully, and will evidently appear upon an attempt to refer any common plant to one of the 15 abovementioned classes. His sections, orders, or secondary divisions, are 47 in number, and depend upon a variety of parts and circumstances. The principal of these are, the disposition, situation, and figure, of the flowers; the nature of the seed-vessel, or cover of the seeds; the situation of the radicle in the seed; the number of seed-lobes, or seminal leaves; the disposition of the leaves, and colour of the flowers. The last-mentioned too, or milkiness, which is observed in the compound flowers with flat florets, is made a characteristic distinction, and discriminates the first order of the 12th class. Thus, in the first systematic arrangements, the characters of the classes only were borrowed from the parts of fructification; while those of the subaltern divisions were very numerous, and respected every part of the plant; but that such divisions might be perfect, they should be constituted, like the classes, from the modifications of a single part of the fructification.

The great object had in view by Morison, who comes next in order to Cæsalpinus, was to investigate the order of nature, not to fabricate an easy method of arranging plants. Hence his system is devoid of uniformity, and clogged with a multiplicity of characters; his classes are frequently not sufficiently distinguished from one another, and the key of arrangement seems totally lost. He sets out with a division of plants, from their consistence, into ligneous or woody, and herbaceous. He founds his system on the fruit, the corolla or blossoms, and the habit of the plants. His classes are as follow. 1. Trees. 2. Shrubs. 3. Undershrubs. 4. Herbs climbing. 5. Herbs leguminous or papilionaceous. 6. Herbs podded. 7. Herbs triapiculate, or with three capules. 8. Herbs with four or five capules. 9. Herbs corymbiferous. 10. Herbs having a milky juice, or downy tops. 11. Herbs culmiferous, as grasses. 12. Herbs umbelliferous. 13. Herbs having three kernels. 14. Herbs having helmet-shaped flowers. 15. Herbs having many capules. 16. Herbs berry-bearing. 17. Herbs called *capillary plants*, as the fern kind. 18. Anomalous or irregular herbs.

Of these classes, the fourth and eighth possess no genuine distinctive character; nor are the ninth and tenth classes sufficiently distinguished; the fifteenth class is not sufficiently distinguished from the eighth, nor the 16th from the fourth. His sections or secondary divisions, which are 108 in number, arise from the figure and substance of the fruit; the number of seeds, leaves, and petals; the figure of the root; the direction of the stem; the colour of the flowers; the place of growth; and, in one class, from the medicinal virtues of some of the plants that compose it.

In 1682, Ray proposed his method to the world, two years after the publication of Morison's, which served in some measure as its basis. It consisted originally of the following 25 classes. 1. Trees. 2. Shrubs. 3. Herbs imperfect. 4. Herbs having no flower. 5. Capillary plants. 6. Staminous herbs having only the stamina. 7. Those having one naked seed. 8. Umbelliferous herbs. 9. Verticillated, annular, or ring-shaped ones. 10. Rough-leaved plants. 11. Stellated or star-shaped ones. 12. Apple-bearing herbs. 13. Berry-bearing

bearing herbs. 14. Herbs having many pods. 15. Monopetalous uniform, or regular herbs. 16. Monopetalous irregular, or having different forms. 17. Tetrapetalous, having large pods. 18. Tetrapetalous, having small pods. 19. Papilionaceous. 20. Pentapetalous herbs. 21. Corns. 22. Grasses. 23. Grass-leaved plants. 24. Bulbous-rooted plants. 25. Plants near akin to the bulbous.

This method Ray carefully corrected and amended at different times; so that the plan of arrangement which now bears the name of that author, and was first published in 1700, is entirely different from what had appeared in 1682. It now consists of 33 classes. Their distinguishing marks are taken from the port or habit of the plants; their greater or less degree of perfection; their place of growth; the number of seed-lobes, or feminal leaves, petals, capsules, and seeds; the situation and disposition of the flowers, flower-cup, and leaves; the absence or presence of the buds, flower-cup, and petals; the substance of the leaves and fruit; and the difficulty of classing certain plants. They are as follow.

1. Submarine, or sea-plants. 2. Fungi. 3. Mosses. 4. Capillary plants. 5. Those without petals. 6. *Pluripetalae*, those with compound flowers; semistoluculous, or half-flowers. 7. Those with compound flowers radiated. 8. Those with compound flowers, stoluculous, or with whole flowers. 9. Plants with one feed. 10. Plants umbellated. 11. Those stellated or star-shaped. 12. Rough-leaved plants. 13. Plants verticillate or whorled. 14. Those with many feeds. 15. Apple-bearing herbs. 16. Berry-bearing herbs. 17. Those with many pods. 18. Monopetalous herbs. 19. Those with two and three petals. 20. Those with great and small, or long and short, pods. 21. Leguminous plants. 22. Pentapetalous ones. 23. Bulbs, and bulbous-like plants. 24. Stamineous ones, or those having only the stamina. 25. Anomalous plants, or those of an uncertain family. 26. The palms. 27. Trees without petals. 28. Trees with an umbilicated fruit. 29. Trees with fruit not umbilicated. 30. Trees with a dry fruit. 31. Trees with poded fruit. 32. Anomalous, or irregular trees.

The distinction into herbs and trees with which Ray's method sets out, acknowledges a different, though not more certain, principle than that of Cæsalpinus and Morison. The former, in making this distinction, had an eye to the duration of the stem; the latter, to its consistence. Ray called in the buds as an auxiliary; and denominates trees, "all such plants as bear buds;" herbs, "such as bear none." But against this auxiliary there lies an unanswerable objection; namely, that though all herbaceous plants rise without buds, all trees are not furnished with them: many of the largest trees in warm countries, and some shrubby plants in every country, being totally destitute of that scaly appearance which constitutes the essence of a bud. In other respects, it is evident that neither Mr Ray's plan nor execution is in any degree calculated to facilitate the knowledge of plants. In fact, it seems to have been Ray's great object, no less than Morison's, to collect as many natural classes as possible; and these being separately investigated, a multiplicity of characters and steps was necessarily required to connect them: and hence the intricacy complained of in both these methods, which must always take place where the classes give rise to the connecting characters, and not the cha-

acters to the classes. The characters of the orders, or secondary divisions, in Ray's method, are no less multifarious than those of the classes. They respect the place of growth of plants; their qualities; the figure of the stem; the number, situation, substance, and division, of the leaves; the situation and disposition of the flowers and calix; the number and regularity of the petals; with the number and figure of the fruit. In his improved method, Ray has adopted Tournefort's characters of the genera, wherever his plan would permit. His general History of Plants contains 18,655 species and varieties. The third volume, which was not published till 1704, and was designed as a supplement to the two former, contains the plants discovered by Tournefort in the Levant, and by Camelli at Luzon one of the Philippin islands. Ray's method was followed by Sir Hans Sloane, in his Natural History of Jamaica; by Petiver, in his British Herbal; by Dillenius, in his Synopsis of British plants; and by Martyn, in his Catalogue of plants that grow in the neighbourhood of Cambridge.

To Ray's original method succeeded that of Christopher Knaut, a German; which acknowledges the same principle, and is manifestly founded upon it. In his enumeration of the plants that grow round Hal in Saxony, published in 1687, he divides vegetables into 17 classes, which have for their basis the size and duration of plants, the presence or absence of the petals, the disposition of the flowers, the substance of the fruit, the number of capsules or seeds, the number and figure of the petals, and the presence, absence, or figure of the calix. His classes are, 1. Herbs berry-bearing. 2. Monopetalous, or with one flower-leaf. 3. Tetrapetalous and regular, with four petals. 4. Tetrapetalous and irregular. 5. Pentapetalous, or with five petals. 6. Hexapetalous, or six petals. 7. Polypetalous, or many petals. 8. Multicapular, or many capsules. 9. Naked seeds. 10. Solid, or not downy. 11. Downy feeds. 12. Without petals. 13. Stameneous, without petals or calix. 14. Imperceptible. 15. Imperfect. 16. Trees. 17. Shrubs.

The sections or subdivisions of the classes in Knaut's method are 62 in number; and arise from the figure of the stem and petals, the number of capsules and cells, their figure, the number of seeds and leaves, and situation of the flowers.

In 1696, a new method proposed by Dr Herman professor of botany at Leyden, was published by Zumbac, who arranged according to it the plants contained in the public garden of Leyden. Rudbeckius the Younger, in a dissertation published the same year, on the fundamental knowledge of plants, adopted Herman's method with a few inconsiderable variations. The classes of Dr Herman are 25 in number. They are founded on the size and duration of the plants; the presence or absence of the petals and calix; the number of capsules, cells, and naked feeds; the substance of the leaves and fruit; the form and consistence of the roots; the situation and disposition of the flowers, leaves, and calix; and figure of the fruit. 1. Herbs having one naked feed and a simple flower. 2. Having one naked feed and a compound flower. 3. With two naked feeds, and stellated or star-shaped. 4. Two naked feeds, and umbelliferous. 5. Four naked feeds, and rough leaves. 6. Four naked feeds, and verticillated or whorl-shaped. 7. With

many naked seeds. 8. Having seed-vessels, bulbous and triapical. 9. Having one seed-vessel. 10. With two seed-vessels. 11. With three seed-vessels. 12. With four seed-vessels. 13. With five seed-vessels. 14. Podded, which are always tetrapetalous. 15. Leguminous and papilionaceous. 16. With many capsules. 17. Having fleshy fruit, berry-bearing. 18. With fleshy fruit, apple-bearing. 19. Without petals, but having a calix. 20. Without petals, chaffy or flamineous. 21. Without petals, calix, chaff, or stamina, *i. e.* a naked anthera, as the mosses. 22. Trees. Imperfect fructification, bearing catkins. 23. Trees with a fleshy fruit umbilicated. 24. Trees with a fleshy fruit not umbilicated. 25. Trees with a dry fruit.

The classes in Herman's method are subdivided into 82 sections or orders; which have for their basis the number of petals, seeds, capsules, and cells, the figure of the seeds and petals, and disposition of the flowers.

To the method of Dr Herman succeeded that of Dr Boerhaave, who succeeded to the botanical chair of Leyden in 1709. His method is that of Herman, blended with part of the systems of Tournefort and Ray; and contains the following classes. 1. Herbs submarine, or sea-plants. 2. Imperfect land-plants. 3. Capillary plants, or the fern kind. 4. Many naked seeds. 5. Four naked seeds, and verticillated. 6. Four naked seeds, and rough leaves. 7. Four naked seeds, and four petals. 8. Plants having one seed-vessel. 9. Two seed-vessels. 10. Three seed-vessels. 11. Four seed-vessels. 12. Five seed-vessels. 13. Many seed-vessels. 14. Two naked seeds, and umbelliferous. 15. Two naked seeds, and star-shaped. 16. One naked seed, and a simple flower. 17. One naked seed, and compound flowers semisofolous. 18. One naked seed, and compound flowers radiated. 19. One naked seed and compound flowers corymbiferous. 20. One naked seed, and compound flowers, sofolous. 21. Berry-bearing herbs. 22. Apple-bearing herbs. 23. Without petals. 24. One cotyledon, and having petals. 25. One cotyledon and without petals. 26. Trees having one cotyledon. 27. Many podded. 28. Podded. 29. Tetrapetalous and cruciform. 30. Leguminous. 31. Having no petals. 32. Bearing catkins. 33. Monopetalous flowers. 34. Rosaceous flowers.

These 34 classes of Dr Boerhaave are subdivided into 104 sections, which have for their characters, the figure of the leaves, stem, calix, petals, and seeds; the number of petals, seeds, and capsules; the substance of the leaves; the situation of the flowers, and their difference in point of sex. By this method, Dr Boerhaave arranged near 6000 plants, the produce of the botanical garden at Leyden, which he carefully superintended for the space of 20 years, and left to his successor Dr Adrien Royen, in a much more flourishing state than he himself had received it. His Index or Catalogue of the Leyden plants was published in octavo in 1710; and afterwards, with great additions, in quarto, in 1720. This last edition contains descriptions of 5650 plants; of which number upwards of two thirds had been introduced into the garden since the time of Herman, by his illustrious successor. Boerhaave's characters are derived from the habit or general appearance of plants combined with all the parts of fructification; so that, as Linnæus very properly observes, he was the first who employed the calix, stamina, and style, in de-

termining the genus. About 17 new genera were established by this author; among others, the very splendid family of the protea and silver-tree, which, although partly described by Morison, had remained generally unknown till this period. His method was adopted by one Emting, a German, in a treatise intitled *The first principles of Botany*, published in octavo at Wolfenbuttle, in 1748.

Hitherto all the botanists had been intent upon investigating the order of nature, rather than facilitating the arrangement of vegetables: therefore their methods were very intricate and perplexed; and their writings, however entertaining to the learned, could afford but very little instruction to the young botanist. In 1690, however, Augustus Quirinus Rivinus, a German, professor of botany at Leipsic, relinquishing the pursuit of natural affinities, and convinced of the insufficiency of characteristic marks drawn only from the fruit, attached himself to the flower, which, he was sensible would furnish characters no less numerous, permanent, and conspicuous, than those drawn from the fruit. The calix, petals, stamina, and style or pointal, which constitute the flower, are sufficiently diversified in point of number, figure, proportion, and situation, to serve as the basis of a mode of arrangement; yet all are not equally proper for this purpose. Rivinus made use of the petals as the largest and most beautiful part, and that from which the flower itself is commonly characterized. His method consists of the following 18 classes, which have for their basis the perfection and disposition of the flowers, and regularity and number of the petals. 1. Regular monopetalous, or having one petal. 2. Dipetalous. 3. Tripetalous. 4. Tetrapetalous. 5. Pentapetalous. 6. Hexapetalous. 7. Polypetalous, or having many petals. 8. Irregular monopetalous. 9. Irregular dipetalous. 10. Irregular tripetalous. 11. Irregular tetrapetalous. 12. Irregular pentapetalous. 13. Irregular hexapetalous. 14. Irregular polypetalous. 15. Compound flowers of regular florets. 16. Compound flowers of regular and irregular florets. 17. Compound flowers of irregular florets only. 18. Incomplete, or imperfect plants.

As Rivinus set out with the professed design of imparting facility to botany, he judged very properly in divesting his method of all extraneous matter, and rendering it as simple and uniform as the nature of the science would admit. The distinction into herbs and trees had been adopted by every writer on plants since the time of Aristotle. Rendered in some measure sacred by its antiquity, this distinction maintained a kind of importance to which it was by no means essentially intitled. Rivinus was the first who in this matter dared to think for himself. He was early sensible of the inconveniences to which those had submitted who employed it as a primary division; and therefore resolved at once to get rid of a distinction that is frequently uncertain, always destructive to uniformity, and in its nature repugnant to the genuine spirit of system, because totally unconnected with the parts of fructification. In the uniformity of its orders or secondary divisions, which are 91 in number, and acknowledge the fruit for their principle, Rivinus's method equals, perhaps excels, all that went before or succeeded it. Only three classes of his method were published by Rivinus himself. These are the 11th, 14th and 15th, which were offered

offered to the public at different times, illustrated with very splendid figures. The method was completed and published entire by Heucher, in a work intitled *Hortus Wittenbergenfis*, printed in quarto at Wittenberg in 1711.

Several German authors have followed Rivinus's method, either wholly or in part, without offering any considerable amendment. The principal of these are, Koenig, in a work on vegetables, published at Basil in 1696; Welfch in his *Basis Botanica*, printed at Leipzig in octavo, in 1697; Gemeinhart, in a catalogue of plants published in 1725; Kramer, in a work intitled *Tentamen Botanicum*, published at Dresden in 1728, and afterwards reprinted with additions at Vienna in 1744; and Hecker, in a dissertation on botany published at Hal in Saxony, in 1734. To these may be added Hebenstreit, an ingenious botanist, who in a treatise on plants published at Leipzig in 1731, just before his famous African expedition, established general characters, which had hitherto been wanting in Rivinus's method.

The writers who have attempted to improve upon Rivinus's method are Bernard Ruppis, Christopher Ludwig, and Christian Knaut. Ruppis in his *Flora Jenensis*, published at Frankfort in 1718, has arranged the 1200 plants there described by a method partly Rivinus's, and partly his own. It consists of 17 classes, and sets out with the same divisions and subdivisions as that of Rivinus; with this difference, however, that, whereas in Rivinus's method all perfect flowers are divided into simple and compound, in Ruppis the division of regular and irregular flowers precedes that just mentioned, and simple and compound flowers are made subdivisions of the regular flowers only.

Christopher Ludwig's method, which was published in 1737, and consists of 20 classes, differs but little from that of Rivinus. The author accompanied Hebenstreit on his expedition into Africa, and seems to have made plants his favourite study. The improvement, however, which he has made on Rivinus's plan, consists only in rendering it more universal, having enriched it with a multitude of genera collected from the works of Tournefort, Ray, Boerhaave, Dillenius, and other eminent botanists, whose general characters he has likewise adopted. His plan of arrangement has been followed by two succeeding writers; M. Wedel, in a botanical essay published in 1747; and three years after by M. Boehmer, in his catalogue of the plants which grow in the garden of Leipzig.

The method of Christian Knaut is much more properly his own, and departs in a much greater degree from that of Rivinus than either of the two former. The regularity and number of the petals furnished the classical divisions in Rivinus's method: in that of Knaut, number takes place of regularity; so that it is very properly termed by Linnæus, "The system of Rivinus inverted." This method was published in 1716; and sets out with a division into flowers which have one petal, and such as have more than one. It consists of the 17 following classes. 1. Monopetalous uniform or regular. 2. Monopetalous difform or irregular. 3. Monopetalous compound uniform or regular. 4. Monopetalous compound difform or irregular. 5. Monopetalous compound uniform and difform together. 6. Dipetalous uniform or regular. 7. Dipetalous difform or irregular. 8. Tripetalous uniform or regular. 9. Tripeta-

lous difform or irregular. 10. Tetrapetalous uniform or regular. 11. Tetrapetalous difform or irregular. 12. Pentapetalous uniform or regular. 13. Pentapetalous difform or irregular. 14. Hexapetalous uniform or regular. 15. Hexapetalous difform or irregular. 16. Polypetalous uniform or regular. 17. Polypetalous difform or irregular.

The sections or secondary divisions in Knaut's method are 121, and depend upon the internal divisions of the fruit; and upon this his opinions are somewhat singular. Every kind of fruit, whether pulpy or membranaceous, is termed by our author a *capsule*. Neither is the term restricted to fruits properly so called: it is extended also to those termed by botanists *naked seeds*, the existence of which Knaut absolutely denies. Agreeable to this opinion, capsules, he says, with respect to their consistence or substance, are of two sorts; pulpy, or membranaceous. The former correspond to the fruits of the apple, berry, and cherry kind; the latter to the capsules properly so called, and naked seeds of other botanists. Again, with respect to their cells or internal divisions, capsules are either simple or compound. Simple capsules have an undivided cavity or a single cell; compound capsules are internally divided into two or more cells. With other botanists, the umbelliferous flowers bear two, the lip-flowers four, naked seeds; according to Knaut, the former produce two, the latter four, simple capsules. Ranunculus, adonis, anemone, herb-bennet, and some other plants, have their flowers succeeded by a number of naked seeds collected into an aggregate or head: each of these seeds passes with Knaut for a simple capsule; so that the whole is an aggregate of several capsules with an undivided cavity or single cell. In numbering the cells or internal divisions of the pulpy fruits, our author has adopted a very singular method. Some fruits of the apple kind inclose a capsule that is divided into five membranaceous cells. It might then be very reasonably expected to find such fruits arranged with compound capsules of five cells; but, instead of this, the author whimsically enough combines in their arrangement the idea both of a simple and compound capsule. The pulpy part is undivided; in other words, it is a simple capsule furnished with one cell; the compound capsule inclosed contains five cells, which added to that of the pulp make the number six; and thus these kinds of fruits are arranged with those having capsules of six cells. By the same kind of reasoning, the fruit of the dogwood, which is of the cherry kind, and contains a stone with two cells or cavities, is placed by Knaut among compound capsules with three cells; the pulp passing for one division, and cavities of the stone or nut for the remaining two. This method of calculation is not the only singularity for which Knaut is remarkable. The effence of the flower is made by Ray, Tournefort, Rivinus, and most other botanists, to consist in the stamina and style. This position Knaut absolutely denies; and has established for a principle, that the flower is essentially constituted by the petals only. With him, the flower-cup, stamina, and style, are of little significance: their presence does not constitute a flower if the petals are wanting; neither is their absence sufficient to destroy its existence if the petals are present. From this it follows, 1. That there can be no flowers without petals; and, 2. That the regularity or irregularity

gularity of the flower can never depend on the stamina and style, which are only occasionally present, and no wife essential to its existence; both of which are evidently false to every botanical reader.

Since the time of Rivinus, no leading method in botany has appeared except that of Tournefort and Linneus. Tournefort sets out with reviving the distinction of plants into herbs and trees, which had been exploded by Rivinus. His system is founded on the regularity and figure of the petals, together with the two-fold situation of the receptacle of the flowers; his orders, on the pistillum or calix. The classes are, 1. Herbs with simple flowers monopetalous, and bell-shaped. 2. Simple flowers monopetalous, tunnel and wheel-shaped. 3. Simple flowers monopetalous, labiated or lipped. 4. Simple flowers monopetalous, anomalous, or irregular. 5. Simple flowers polypetalous, cruciform or cross-shaped. 6. Simple flowers polypetalous, and rosaceous or like a rose. 7. Simple flowers polypetalous, umbellated. 8. Simple flowers polypetalous, caryophyllaceous, clove-form. 9. Simple flowers polypetalous, liliaceous or lily-form. 10. Simple flowers polypetalous, papilionaceous, or butterfly form. 11. Simple flowers polypetalous, anomalous or irregular. 12. Compound flowers, flosculous, tubular or whole florets. 13. Compound flowers semisflosculous, flat or half florets. 14. Compound flowers radiated, like the spokes of a wheel. 15. Apetalous, having no petals. 16. No flower, but bearing seed. 17. No flower nor seed, in the vulgar estimation. 18. Trees with no petals, but bare stamina. 19. Trees with no petals, bearing catkins. 20. Trees monopetalous. 21. Trees rosaceous. 22. Trees papilionaceous.

The secondary divisions in Tournefort's method, which are 122 in number, have obtained the name of *sections*. Their general distinctions are founded principally upon the fruit, as those of the classes are upon the flower.

Tournefort hath been followed by a vast number of botanical writers, of whom the most considerable are, Dr William Sherard, an eminent botanist of the last and present centuries. In 1689, he published the first sketch of Tournefort's method, under the title of *Schola Botanica*; or a catalogue of the plants demonstrated by Dr Tournefort, in the royal garden at Paris. It was not till five years after, that the *Elementa Botanica*, a work which contains the rudiments and illustration of his method, was published by Tournefort himself.—Father Plumier, termed by way of eminence, the *Tournefort of America*, published in 1703, at Paris, a description of American plants, which he has arranged according to the system of Tournefort. In this work he accurately characterized 96 new genera. Falugi, an Italian, has described, in pretty elegant Latin verse, all the genera of Tournefort, in a work intitled *Protopoia Botanica*, published at Florence, 12^{mo}, 1705. Several celebrated French academicians, particularly Marchant, Dodart, Nissole, Jusseu, and Vaillant, have also occasionally paid their tribute of acknowledgment to this author, from the year 1700 to 1740. The other authors of note who have followed Tournefort's method, are, M. Petit, an ingenious French botanist; Johnen, a German, author of a treatise published at Colberg in 1710, entitled *Vade mecum Botanicum, seu Odeus Botanicus*; Feuille, in his description of the

plants of Chili and Peru, published at Paris in quarto, 1714; Christophor Valentin, a German, author of a book intitled *Tournefortius Contractus*, published at Francfort, in folio, in 1715; Ripa, an Italian, in a work intitled *Historie Univerfalis Plantarum Conscripti Propositum*, published in quarto, at Padua, in 1718; Michael Valentin, a German, in his *Viridarium Reformatum*, published in folio, at Francfort, in 1719; the celebrated Dillenius, professor of botany at Oxford, and author of several much esteemed publications on botany, particularly the *Hortus Elthamensis*, and History of Mosses, in his *Flora Giffensis*, printed at Francfort in 1719; Pontedera, an Italian, author of the delineation of a method which combines those of Tournefort and Rivinus, published at Padua, in his botanical dissertations, in 1720; Monti, an Italian, in a work published at Bologna in 1724, under the title of *Indices Plantarum Varii*; Lindem, a German, in his *Tournefortius Alsatius*, first published in 1728; Signior Micheli, author of several curious discoveries respecting mosses and mushrooms, in his *Nova Genera Plantarum*, published in folio at Florence, in 1729; Elvebemes, a Swede, in a work published in the Swedish language, at Upsal, in 1730; Fabricius, a German, author of a work intitled *Primitie Floræ Butifacensis, seu sex Decades Plantarum Rariorum*, published in 1743; Sabbati, an Italian, in his catalogue of the plants that grow in the neighbourhood of Rome, printed at Rome in 1745; and the ingenious Dr Charles Alston, late professor of botany at Edinburgh, in his *Tyrocinium Botanicum*, published at Edinburgh in 1753.

Of all this numerous list of writers, Father Plumier and Pontedera alone have ventured to quit the tract pointed out by Tournefort. The former, in his arrangement of American plants, has relinquished the distinction into herbs and trees; but the latter has attempted more considerable variations. His classes are, 1. Uncertain. 2. Having no flowers. 3. Without buds, imperfect plants. 4. Anomalous or irregular. 5. Labiated. 6. Bell-shaped. 7. Saucer-shaped. 8. Wheel-shaped. 9. Tunnel-shaped. 10. Flosculous. 11. Semisflosculous. 12. Radiated. 13. Irregular. 14. Papilionaceous. 15. Liliaceous. 16. Caryophyllaceous. 17. Cruciform, or 'cross-shaped. 18. Umbellated. 19. Staminous, or with naked stamina. 20. Bearing buds, apetalous, or without petals. 21. Bearing buds irregular. 22. Bearing buds bell-shaped. 23. Bearing buds wheel-shaped. 24. Bearing buds tunnel-shaped. 25. Bearing buds, papilionaceous. 26. Bearing buds, rosaceous.

Besides all these methods, there have been invented two others, founded upon the calix. The first of these was the invention of Peter Magnol, a celebrated professor of botany at Montpellier, and published in 1720, five years after the author's death. The other was delineated by Linneus, and published in his *Classes Plantarum*, in 1738, three years after the publication of the sexual system. Magnol distinguishes two kinds of calix; one external, which envelops and sustains the flower, and is the flower-cup properly so called; the other internal, which is the seed vessel or fruit. According to this idea, all plants, whether herbaceous or woody, are furnished with either the external calix only, or with both. His classes are, 1. Herbs with the calix external, including a flower unknown. 2. Calix external, including a flower staminous. 3. Calix external, including

including a flower monopetalous. 4. Calix external, including a flower polypetalous. 5. Calix external, including a flower compound. 6. Calix external, supporting a flower monopetalous. 7. Calix external, supporting a flower polypetalous. 8. Calix internal only, which is the corolla. 9. Calix external and internal, flower monopetalous. 10. Calix external and internal, flower with two and three petals. 11. Calix external and internal, tetrapetalous. 12. Calix external and internal, polypetalous. 13. Trees with the calix external only. 14. Calix internal only. 15. Calix external and internal both.

The characters of the orders, or secondary divisions, in Magnol's method, are derived chiefly from the figure of the calix, petals, and seeds; from the disposition of the flowers, from the number of petals, and substance of the fruit. Fifty-five sections or orders arise from the combination of these characters with those of the classes; and these are again subdivided into genera, which possess this singularity, that, in place of distinctive characters hitherto employed, they exhibit complete descriptions of all the parts of fructification of one or two species of each genus. From this improvement Linnaeus manifestly borrowed the hint of his general characters.

* Vol. I.
p. 130.

Sir John Hill, in his vegetable system, endeavours to class plants according to their internal structure*. "Perhaps," (says he), upon the foundation of a true anatomy of plants a natural method may be established: for it is certain, the forms of all the external parts of vegetables depend on the disposition of the internal; and all their differences are founded there. On the different inner structure of the vegetable body under certain courses of its vessels evidently depend the differences which characterize the seven first families, to the distinctions of which all classes are subordinate; and as these original distinctions are truly natural, we may here begin very safely.

"The seven families are these, 1. The mushrooms. 2. The algae, or foliaceous sea and land plants. 3. The mosses. 4. The ferns. 5. The grasses. 6. The palms. 7. The common race of plants. Their distinctions one from another are these:

"1. The mushrooms are fleshy; and are destitute of leaves and visible flowers. 2. The algae are merely foliaceous, the entire plant consisting of a leafy matter without other visible parts. 3. The mosses have processes of the inner rind for leaves. 4. The ferns consist of a single leaf raised on a stalk; and bear their flowers upon its back. 5. The grasses have jointed stalks and undivided leaves, and husks to hold the seeds. 6. The palms have a simple trunk, with leaves only on the top, and have the flowers and fruit in divided ears."

Lastly, the seventh class, which he calls the common

race of plants, are such as have their roots, leaves, stalks, flowers, and fruits, distinct and obvious; and have not the characters of any of the other six families.

To this natural method his artificial one, consisting of 43 classes, and which takes up the whole of his voluminous work, is designed only as an index; but as this is universally allowed to be inferior to Linnaeus's, tho' he pretends to improve that system, we think it needless to take any farther notice of it.

Besides the sexual system of Linnaeus, which is now almost universally followed, he formed another, which, like that of Magnol, had the calix for its basis; but greatly superior both in the idea and execution, being indeed singularly serviceable to the novice in botany, by familiarizing to him various appearances of an organ so important in its nature, and so diversified in its form, as the calix is. The classes are, 1. Spathaceous like a sheath or hose. 2. Glumose or chaffy. 3. Amentaceous, or catkins. 4. Umbellated. 5. Common calix or flower-cup. 6. Double calix. 7. Flowering; the petals and stamina inserted into the flower-cup. 8. Crowned, or crown-shaped, with a radius. 9. Irregular. 10. Difform, or different shapes. 11. Caducous, which fall off or shed their leaves. 12. Not caducous, uniform and monopetalous. 13. Not caducous, uniform and polypetalous. 14. Not caducous, difform and monopetalous. 15. Not caducous, difform and polypetalous. 16. Incomplete calix. 17. Apetalous, or a bare calix without petals. 18. Naked, or neither petals nor calix.

SECT. IV. *Of the Method of reducing Plants to Classes, Orders, Genera, and Species, according Linnaeus's Sexual System.*

THIS method of reducing plants to classes, genera, and species, is founded upon the supposition that vegetables propagate their species in a manner similar to that of animals. Linnaeus endeavours to support this hypothesis by the many analogies that subsist between plants and animals, which shall be more particularly pointed out in the next section. It is from this circumstance that Linnaeus's system of botany has got the name of the *sexual system*. The names of his classes, orders, &c. are all derived from this theory. He calls the stamina of flowers the *males*, or the male parts of generation; and the pistils *females*, or the female parts of generation. Plants whose flowers contain both male and female parts, are said to be *hermaphrodites*, &c. His classes, orders, and genera, are all derived from the number, situation, proportion, and other circumstances attending these parts, as will appear from the following

SCHEME of the SEXUAL SYSTEM.

See Plate LIX.

PLANTS celebrate their nuptials

Either publicly, *i. e.* have visible flowers.*Monoclinia*, males and females in the same bed:—*i. e.* The flowers are all hermaphrodite, having stamina and pistils in the same flower.*Diffinitas*, the males or stamina unconnected with each other.*Indifferentissimus*, the males or stamina having no determinate proportion betwixt each other as to length.1. MONANDRIA, *i. e.* one male or stamen in a hermaphrodite flower.

2. DIANDRIA, — two males or stamina.

3. TRIANDRIA, — three males.

4. TETRANDRIA, — four males.

5. PENTANDRIA, — five males.

6. HEXANDRIA, — six males.

7. HEPTANDRIA, — seven males.

8. OCTANDRIA, — eight males.

9. ENNEANDRIA, — nine males.

10. DECANDRIA, — ten males.

11. DODECANDRIA, — eleven males.

12. ICOSANDRIA, — twenty, or more males inserted into the calix, and not into the receptacle.

13. POLYANDRIA, — all above twenty males inserted into the receptacle.

Subordinatio, two of the males or stamina uniformly shorter than the rest.

14. DIDYNAMIA, — four males, two of them uniformly shorter than the other two.

15. TETRADYNAMIA, — six males, two of which are uniformly shorter than the rest.

Affinitas, the males or stamina either connected to each other, or to the pistillum.

16. MONDELPHIA, the males or stamina united into one body by the filaments.

17. DIADELPHIA, the stamina united into two bodies or bundles by the filaments.

18. POLYADELPHIA, the stamina united into three or more bundles by the filaments.

19. SYNGENESIA, the stamina united in a cylindrical form by the antheræ.

20. GYNANDRIA, the stamina inserted into the pistillum.

Diclinia, males and females in separate beds; *i. e.* plants that have male and female flowers in the same species.

21. MONOECIA, male and female flowers in the same plant.

22. DIOECIA, male flowers in one plant, and females in another, of the same species.

23. POLYGAMIA, male, female, and hermaphrodite flowers in the same species.

Or clandestinely, *i. e.* whose parts of fructification are invisible.

24. CRYPTOGAMIA, the flowers invisible, so that they cannot be ranked according to the parts of fructification.

These 24 classes comprehend every known genus and species. It is an easy matter to class a plant belonging to any of the first 11 classes, as they all depend on the number of stamina or male parts, without regard to any other circumstance. The 12th class requires more attention. When the stamina amount to above 20, a tyro will be apt to imagine that the plant belongs to the polyandria class. In reducing plants of this kind to their classes, particular regard must be had to the insertion of the stamina. If they are inserted into the calix or cup, the plant belongs to the icosandria class; if to the receptacle or basis of the flower, it belongs to the polyandria.

The 14th class is likewise in danger of being confounded with the 4th. In the 4th, the number of stamina is the same with that of the 14th: But, in the 14th, two of the stamina are uniformly much shorter than the other two; at the same time each particular stamen belonging to the different pairs stands directly opposite to one another.

The 15th class may be mistaken for the 6th, as they consist of the same number of stamina. But in the 15th, four of the stamina are uniformly longer than the other two; and these two are always opposite to each other.

O R D E R S.

In the first 13 classes, the orders, which are inferior divisions, and lead us a step nearer the genus, are taken from the pistils or female parts, in the same manner as the classes from the stamina: monogynia, digynia, trigynia, tetragynia, &c. *i. e.* one, two, three, four, &c. female parts: when the pistils or female parts have no stalk or filament like the stamina, they are numbered by the stigmata or tops of the pistils, which in that case adhere to the capsule in the form of small protuberances, as may be observed in the flowers of the poppy, &c.

The orders of the 14th class are derived from a different source. The plants belonging to it have their seeds either inclosed in a capsule, or altogether uncovered. Hence they naturally admit of a division into the following orders, viz. *gymnospermia*, comprehending such as have naked seeds; and *angiospermia*, which comprehends such as have their seeds covered, or inclosed in a capsule.

The 15th class is divided into two orders, viz. the *siliculosa*, or those which have a short siliqua or pod; and the *siliquosa*, or those which have a longer siliqua.

The





The orders of the 16th, 17th, 18th, and 20th classes, are taken from the number of stamina; *e. g.* monodelphia pentandria, decandria, polyandria, &c.

The SYNGENESIA, or 19th class, consists of plants whose flowers are compounded of a great number of small flowers or floscules included in one common calix. The orders of this class are,

Polygamia equalis, or such whose floscules are all furnished with stamina and pistils.

Polygamia spuria, comprehends those which have hermaphrodite floscules in the disk, and female floscules in the margin. This circumstance is made the foundation of the three following orders. 1. *Polygamia superflua*, includes all those whose hermaphrodite flowers in the disk are furnished with stigmata, and bear seed; and whose female flowers in the radius likewise produce seeds. 2. *Polygamia frustranea*, include such as have hermaphrodite seed-bearing floscules in the disk; but whose floscules in the radius, having no stigmata, are barren. 3. *Polygamia necessaria*, is the reverse of the former; the hermaphrodite flowers in the disk want stigmata, and are barren; but the female floscules in the radius are furnished with stigmata, and produce seeds.

Polygamia segregata, many floscules included in one common calix, and each of the floscules likewise furnished with a perianthium proper to itself.

Monogamia. This order consists only of seven genera, *viz.* the strumphia, seriphium, corymbium, jassone, lobelia, viola, and impatiens; none of which have properly compound flowers, but are ranked under this class purely from the circumstance of having their stamina united by the antheræ.

The orders of the 21st class are partly taken from the number of stamina, and partly from the names and characters peculiar to some of the other classes; *e. g.* monœcia triandria, monœcia syngenesia, monœcia gynandria.

The orders of the 23^d are all taken from classical characters; *e. g.* polygamia monœcia, polygamia diœcia, and polygamia triœcia.

The 24th, or CRYPTOGAMIA class, is divided into the four following orders: 1. *Filices*, comprehending all plants that bear their seed in the back or edges of the leaf, and those that are called *capillary plants*. 2. *Musci*, which comprehends all the moss kind. 3. *Algae*, including the lichens, fuci, and many others whose parts of fructification are either altogether invisible or exceedingly obscure. 4. *Fungi*, comprehending all the mushroom tribe.

Having thus explained the method of reducing plants to their classes and orders, we shall proceed to inform the young botanist how to investigate the genus. This depends upon minuter distinctions, and requires more attention. But it is impossible to investigate the genera, without being previously acquainted with a considerable number of terms. All the terms necessary for this purpose belong to the parts of fructification. To attempt to give an idea by words of the parts to which particular terms are applied, would not only be difficult, but, in a great measure, useless, especially to such as are totally ignorant of botany. We shall therefore give a list of the terms themselves, with proper references to the figures of the things signified by them,

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which will both be shorter, and more intelligible than the most accurate description that language is capable of.

List of Terms belonging to the Flowers and Parts of Fructification. See Plate LX.

FIG. 1. *Spatha*, a species of calix opening longitudinally when the flower breaks through it.

2. *Spadix*, a species of receptacle peculiar to palm-trees, which consists of fruit-bearing branches included in a spathe.

3. a, *Gluma*, another species of calix, belonging chiefly to grasses and corns, and consists of different valves; b, *arista*, or awn.

4. a a, *Umbella universalis*, comprehends the whole flowers, &c. arising from a common centre, and resembling a large fan. b, *Umbella partialis*, or a smaller parcel of the flowers, &c. resembling a small fan. c c, *Involucrum universale*, a species of calix in which the whole flowers were inclosed before their blowing. d d, *Involucrum partiale*, a lesser calix, which includes a smaller bundle of flowers, and which, before their blowing, is inclosed in the involucre universale. Examples of these are found in the Hemlock, Carrot, &c.

5. c, *Calyptra*; b, *operculum*; a, *capitulum*. These terms are peculiar to inflores.

6. *Amentum*, a species of calix, *e. g.* in the Willow, Birch-tree, &c.

7. *Strobilus*, a pericarpium or capsule composed of an amentum, an example of which occurs in the magnolia.

8. *Fungi*. a, *Pileus*; b, *volva*; c, *stipes*. These terms are mostly applied to the parts of mushrooms.

9. a, *Receptaculum commune nudum*, the common receptacle, or base of the flower, when the stamina, pistil, capsule, &c. are taken off.

10. *Receptaculum commune paleis imbricatum*, or common receptacle imbricated or tiled with paleæ, or membranaceous lamellæ.

11. *Corolla monopetalæ*. a, *Tubus*; b, *limbus*; *i. e.* a, the tube; b, the edge or margin of a monopetalous corolla. The corolla signifies the flower-leaf, when it consists but of one, and the whole flower-leaves, when it consists of more.

12. Is a flower laid in a proper position for shewing its different parts. a, *Germen*, which includes the seeds and capsule in which they are inclosed; b, *stylus*, which is a continuation of the germen; c, *stigma*, or top of the stylus; d d d d, *filamenta*, or threads; e e e e, *antheræ*. The filamenta and antheræ, considered as a whole, are called *stamina*; and the germen, stylus, and stigma, as a whole, are called *pistillum*. f f f f, *Petala*, or flower-leaves.

13. a, The *ungues*, or claws; b, the *laminæ*, or plates of a polypetalous corolla, or corolla consisting of several flower-leaves.

14. a, *Nectarium campanulatum in narcisso*, or bell-shaped nectarium of the narcissus. *Nectarium* is applied to every glandular part of a flower which secretes a sweet juice. Their structure is very different in different plants.

15. *Nectaria cornuta in acnito*, horned nectaria of the monkhood.

16. *Horned nectarium* in the calix of the tropæolus.

8 A

17.

Fig.

17. *a a a*, *Nectarium in parnassia*; the nectaria of the parnassia galls are six in number, each of which have 13 styli, with round buttons on their tops.
18. *a*, *Perianthium*, that species of calix which is contiguous to the fructification; *b*, *germen*; *c*, *stylus*; *d*, *stigma*; *e e*, *filamenta*; *f f*, *antheræ debiscentes*, or antheræ shedding the pollen or dust; *g*, *anthera integra*, i. e. the appearance of the anthera before it sheds the pollen.
19. *a*, The filament, and *b*, the anthera, separated from the flower.
20. *a*, One grain of the pollen magnified by a microscope; *b*, *halitus elasticus*, i. e. an elastic aura supposed to be necessary for impregnating the seeds.
21. *a*, *Germen*; *b*, *stylus*; *c c*, *stigma*.
22. *Folliculus*; i. e. a pericarpium consisting only of one valve, opening longitudinally, and in which the seeds do not adhere to the future, but are inclosed in a particular receptacle *a*.
23. *Legumen*, is a double-valved pericarpium, having the seeds fixed only to one of the futures *a a*.
24. *Siliqua*, is a double-valved pericarpium with the seeds fixed to both futures or margins *a b*.
25. *Ponium*, a pericarpium without any valve, but made up of a pulpy substance, and containing a capsule in which the seeds are inclosed, as in the apple, &c. *a*, The pericarpium; *b*, the capsule, or seed-case.
26. *a*, *Drupa*, or a pericarpium containing a nut or stone, and having no valve, *e. g.* plumbs, &c. *b*, The nucleus, or stone.
27. *Bacca*, or berry, is a pericarpium containing naked seeds dispersed through the pulpy part.
28. *Capsula apice debiscentis*, a capsule opening at the top to allow the seeds to fall out.
29. Four capsules included in a common pericarpium. *a a*, The valves; *b b*, the dissepiment, or partition which separates the different seed-capsules from one another; *c*, columella, or central column, by which the capsules are connected.
30. A capsule cut open longitudinally, to show the receptacle of the seeds.
31. *Pappus*, a kind of corona or crown which is either hairy or penniform, and connected to the seeds of some plants, by means of which they are blown about by the wind. *a*, *Pappus pilosus*, or pappus resembling a hair; *b*, *pappus plumosus*, or feathered pappus; *c*, *semen*; *d*, *stipes*. The Dandelion, and many plants of the syngenesia class, afford examples of these parts.

TERMS belonging to the *Pedunculus* or *Footstalks* of *Flowers*. Plate LXI.

32. *Corymbus*, i. e. flowers upon alternate pedunculi and foot-stalks, elevated proportionally above each other.
33. *Racemus*, a pedunculus or foot-stalk furnished with lateral branches.
34. *Spica*, alternate sessile flowers [i. e. flowers without any particular foot-stalk, but inserted directly into one common to the whole], upon a common foot-stalk; as in the Scirpus.
35. *Verticillus*. This term is applied to such plants as have clusters of flowers at different distances surrounding the caulis or stem; as in several species of Mint.

Fig.

36. *Panicula*, i. e. flowers placed sparsely upon separate foot-stalks; as in Oats, &c.

When these terms are understood, the genus may be easily investigated. But, in order still further to assist the young botanist, we shall give a systematic description of a few common plants belonging to different classes.

DIANDRIA MONOGYNIA.

VERONICA, or SPEEDWELL.

THE CALIX is a perianthium (18) divided into four parts or segments, and persistent (i. e. does not fall off till the seeds are ripe); the segments are sharp and lance-shaped.

THE COROLLA (11) consists of one rotated petal; the *tubus* (11) is about the same length with the calix; the *limbus* (11) is plane, and divided into four oval segments, the lowest of which is narrower than the rest, and the one immediately opposite broader.

THE STAMINA (12) are two, narrower below, and inclined upwards; the antheræ (12) are oblong.

THE PISTILLUM (12) has a compressed germen (12), a filiform or thread-like stylus (12), about the same length with the stamina, and a little declined to one side: the stigma (12) is simple.

THE PERICARPIMUM (12) is a heart-shaped capsule, compressed at the top, and having two cells or partitions, and four valves.

THE SEEDS are roundish and numerous.

ICOSANDRIA POLYGAMIA.

FRAGARIA, or STRAWBERRY.

THE CALIX is a perianthium, consisting of one plain leaf, divided into ten segments, each alternately narrower.

THE COROLLA has five roundish open petals inserted into the calix.

THE STAMINA are 20 in number, subulated or tapering, shorter than the corolla, and inserted into the calix. The antheræ are lunulated, or shaped like a crescent.

THE PISTILLUM consists of many small germina, collected into a little head or knob. The styli are simple, and inserted into the sides of their respective germina. The stigmata are simple.

THE PERICARPIMUM is wanting in this plant. But the common receptacle of the seeds, which supplies the place of a pericarpium, is a roundish oval berry, plain at the base, pretty large, soft, pulpy, coloured, and deciduous, i. e. falls off before the seeds are ripe.

THE SEEDS are small, pointed, very numerous, and dispersed through the superficial part of the receptacle.

DIDYNAMIA ANGIOSPERMIA.

DIGITALIS, or FOX-GLOVE.

THE CALIX is a perianthium, divided into four deep-cut segments, which are roundish, sharp at the top, persistent, and the highest one is narrower than the rest.

THE COROLLA consists of one bell-shaped petal; the *tubus* is large, open, ventricose or bellied at the back-side; the base is cylindrical and narrow: the *limbus* is small, and divided into four segments; the superior seg-





segment is more open and more emarginated than the rest.

The STAMINA are four, subulated (44), inserted into the base of the corolla, and inclined to the same side; two of them are longer than the other two: the anthers are divided into two parts, and pointed at the top.

The PISTILLUM consists of a germen sharp at the top, a simple stylus situate like the stamina, and an acute stigma.

The PERICARPium has an oval capsule, of the same length with the calix, sharp at the top, having two cells, and two valves which burst open at both sides.

The SEEDS are many and small.

TETRADYNAMIA SILIQUOSA.

SINAPIS, or MUSTARD.

THE CALIX is a perianthium consisting of four open or spreading leaves; the leaves are linear (43), concave, furrowed, disposed in the form of a cross, and deciduous.

* The COROLLA consists of four cruciform petals: the petals are roundish, plain, open, entire or not emarginated, with erect linear unguis (13) scarcely so long as the calix.

The NECTARIA (14, &c.), or *glandule nectariferæ*, are four, of an oval figure, one of which is situate on each side betwixt the short stamina and stylus, and likewise one on each side between the long stamina and the calix.

The STAMINA have six subulated erect filaments, two of which are of the same length with the calix, and always opposite to each other, and the other four are uniformly longer: the *antheræ* are erect, and sharp at the top.

The PISTILLUM has a cylindrical germen; the stylus is of the same length with the germen, and the same height with the stamina; the stigma is entire, with a little knob or button.

The PERICARPium is an oblong, scabrous, double-celled, two-valved pod, gibbous, and full of little protuberances on the under parts: the dissepimentum (29) is large, compressed, and often twice the length of the valves.

The SEEDS are many and round.

MONODELPHIA POLYANDRIA.

MALVA, or COMMON MALLOW.

THE CALIX is a double perianthium: the exterior one consists of three lanceolated, loose, persistent leaves; the interior has but one large, broad, persistent leaf, divided into five segments.

The COROLLA has five plain leaves, united at the base, heart-shaped, and premorse (54).

The STAMINA consist of numerous filaments, united into a cylindrical form below, loose above, and inserted into the corolla: the *antheræ* are kidney-shaped.

The PISTILLUM has an orbicular germen, a cylindrical short stylus, and many bristly stigmata of an equal length with the stylus.

The PERICARPium consists of several distinct capsules joined by an articulation, resembling a depressed globe, and opening from within when ripe: the receptaculum is a kind of column binding the capsules together.

The SEEDS are solitary, and kidney-shaped.

SYNGENESIA POLYGAMIA ÆQUALIS.

LEONTODON, or DANDELION.

THE COMMON CALIX is oblong, and imbricated: the *interior scales* are linear, parallel, equal, and open at the top; the *exterior scales* are fewer in number, and frequently reflected at the base.

The compound COROLLA is uniform and imbricated. The small hermaphrodite corollæ are very numerous and equal.

The corolla proper to each floscule consists of one ligulated (*i. e.* plain and expanded outwards), linear, truncated (*i. e.* terminated by a transverse line), and five-toothed petal.

The STAMINA consist of five very small capillary filaments: the *antheræ* are connected together, and form a cylindrical tube.

The GERMEN of the *pisillum* is situate below the proper corolla. The stylus is filiform, and nearly of the same length with the corolla: the stigmata are two, and turned back in a spiral form.

This plant has no pericarpium.

The SEEDS are solitary, oblong, rough, and terminated by a long pappous stipes (31).

The receptacle, or common base of the floscules (9), is naked, and full of small hollow points.

GYNDRIA PENTANDRIA.

PASSIFLORA, or PASSION-FLOWER.

THE CALIX is a perianthium consisting of five plain, coloured leaves, similar to those of the corolla.

The COROLLA consists of five plain obtuse semi-lanceolated leaves, of the same magnitude and figure with those of the calix.

The *nectarium* is a triple corona, the exterior of which is longest, surrounding the stylus within the petals, and straitened above.

The STAMINA are five, subulated, open, and connected to the stylus at the base of the germen: the *antheræ* are oblong, obtuse, and incumbent.

The PISTILLUM consists of an erect cylindrical stylus, upon the top of which an oval germen is placed: the styli are three, thicker, and wider above: the stigmata are roundish knobs.

The PERICARPium is a fleshy, suboval, one-celled berry, resting upon the stylus.

The SEEDS are numerous, oval, and each of them inclosed in a small membrane.

MONOECEIA TETRANDRIA.

URTICA, or COMMON NETTLE.

THE CALIX of the male flowers is a four-leaved perianthium; the leaves are roundish, concave, and obtuse.

The COROLLA has no petals; but there is a small urceolated (*i. e.* an inflated skin, gibbous on each side) nectarium in the centre of the flower.

The STAMINA consist of four subulated open filaments, of an equal length with the calix, and one of them is placed between each leaf of the calix: the *antheræ* have no cells.

The CALIX of the female flowers is a double-valved, oval, concave, erect, persistent perianthium.

The COROLLA is wanting.

The PISTILLUM has an oval germen, no stylus, and

a downy stigma.

They have no *pericarpium*.

The SEED is single, oval, shining, and a little compressed.

These examples will not only illustrate most of the generic terms, but will likewise fix them in the mind more successfully than any formal explanation.

But the young botanist, after advancing thus far, must still be conducted a step further. Though he may be able to reduce plants to their classes, orders, and genera, he is hitherto totally ignorant of the specific characters. Before he be able to investigate the species, he must again submit to learn a considerable number of terms necessary for that purpose.

List of Terms necessary for investigating the Species of Plants. Plate LXI.

Fig.

37. *Orbiculatum*, of a circular figure.

38. *Subrotundum*, roundish or nearly circular.

39. *Ovatum*, ovate; or having its longitudinal diameter longer than the transverse, with its base forming a segment of a circle, and the top also roundish, but narrower.

40. *Ovale*, five *Ellipticum*, oval or elliptical.

41. *Oblongum*, oblong; or having its longitudinal diameter exceeding the transverse any number of times, as twice, thrice, &c.

42. *Lanceolatum*, lanceolate, or oblong, and drawing to a point at each end.

43. *Lineare*, linear, or every where of the same breadth.

44. *Subulatum*, subulate, linear at the base, and afterwards tapering to a point, like an awl.

45. *Reniforme*, reniform, kidney-shaped; *i. e.* roundish, with the base hollow, and having no sharp points behind.

46. *Cordatum*, cordate, heart-shaped, *i. e.* nearly ovate, with a *sinus*, or hollow at the foot-stalk, but no sharp points or angles behind.

47. *Lunulatum*, lunulate, resembling a crescent or half-moon.

48. *Triangulare*, triangular, or three cornered.

49. *Sagittatum*, sagittate, like an arrow head, *i. e.* triangular, with a *sinus* or hollow betwixt the two hinder angles or points.

50. *Cordato-sagittatum*, heart-shaped behind and sharp like the point of an arrow before.

51. *Hastatum*, halberd-shaped; *i. e.* like an arrow-head, with a *sinus* or hollow betwixt the hinder angles, and the angles themselves projecting out on each side.

52. *Fissum*, notched, nicked, or cut in at the top, so as to have the bottom of the notch or cut sharp, and its sides straight.

53. *Trilobum*, three-lobed, or having three (55) lobes.

54. *Premorsum*, fore-bitten, or as if a piece were bitten out of the fore-part of it.

55. *Lobatum*, lobed; or divided, down to the middle, into parts or segments standing asunder from one another.

56. *Quinquangulare*, having five points or angles.

57. *Erosum*, eroded, or as if it had bits irregularly gnawed out of the fore-part of it.

58. *Palmatum*, palmated; divided down, lower than the middle, into nearly eq. lobes.

Fig.

59. *Pinnatum*, pinnated, or having any number of feuillets or small leaves connected on each side to one simple petiole.

60. *Laciniatum*, laciniated; having the disc variously cut, or as it were slit downwards, into parts of no determinate or regular figure.

61. *Sinuatum*, sinuated; having wide sinuses or hollows in the sides.

62. *Dentato-sinuatum*, sinuated so that the segments betwixt the sinuses resemble teeth.

63. *Retrorsum-sinuatum*; sinuated, with the parts betwixt the sinuses turned towards the base.

64. *Partitum*, partite; divided almost to the base.

65. *Repandum*, having a serpentine edge and the disc plain.

66. *Dentatum*, dentated; toothed, or having the tops of the segments patent or remote from each other.

67. *Serratum*, serrated, or having all the points of the teeth turned towards the fore-part.

68. *Duplicato-serratum*, doubly serrated, or having the larger serratures or teeth surrounded with smaller ones.

69. *Duplicato-crenatum*, doubly crenated, or having the larger crenæ or notches surrounded with smaller ones (74).

70. *Cartilagineum*, cartilaginous, the margin of which is gristly.

71. *Acute-crenatum*, acutely crenated, or having the crenæ or notches sharp at the top.

72. *Obtuse-crenatum*, obtusely crenated, or having the tops of the crenæ or notches blunt.

73. *Plicatum*, plaited, having the disc towards the edge raised and depressed so that each turn forms an angle: *Alchemilla*.

74. *Crenatum*, crenated, cut in or notched so that the notches turn towards neither extremity.

75. *Crispum*, curled; when the margin grows larger than the disc, and runs into irregular waves.

76. *Obtusum*, obtuse; blunt, or terminated within the segment of a circle.

77. *Acutum*, acute; sharp, or terminated by an acute angle.

78. *Acuminatum*, acuminate, or terminated by a subulate or sharp point.

79. *Obtusum cum acumine*, obtuse with a sharp point superadded.

80. *Emarginatum acutè*, acutely emarginated, or having a sharp notch at the top.

81. *Cuneiforme-emarginatum*, cuneiform, and emarginated; or wedge-shaped, with a notch at the top.

82. *Retusum*, retuse, terminated by an obtuse *sinus* or notch.

83. *Pilosum*, hairy; covered with long distinct hairs.

84. *Tomentosum*, tomentose; covered with fine downy hairs interwoven together and scarcely discernible, like flax silk.

85. *Hispidum*, bristly, having brittle and hard bristles scattered over its disc.

86. *Ciliatum*, ciliated; having parallel bristles, resembling eye-lashes, round the margin.

87. *Rugosum*, wrinkly, or full of wrinkles.

88. *Venosum*, venose; having veins or nerves with many ramifications.

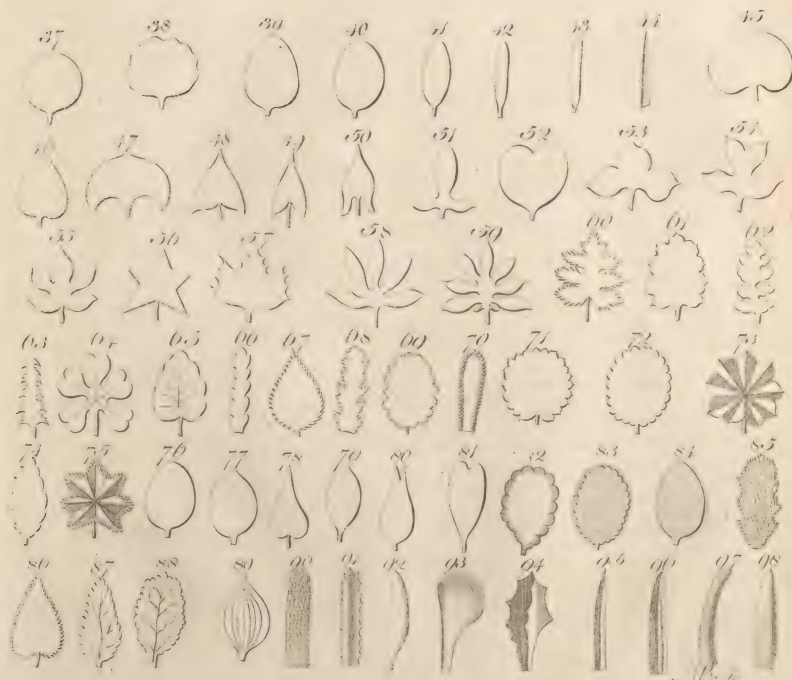
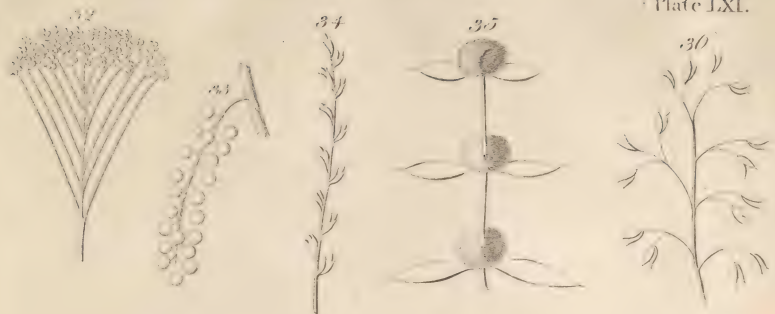




Fig.

89. *Nervosum*, nervose, with veins or nerves extending from the base to the top without any branches.
90. *Papillosum*, papillose, covered with minute fleshy points convex or elevated above the disc.
91. *Linguiforme*, linguiform, tongue-shaped, *i. e.* fleshy, linear, obtuse, and convex below.
92. *Acinaciforme*, cimeter-shaped; *i. e.* compressed, fleshy, with the one edge convex and thin, and the other thicker and straighter.
93. *Delabriforme*, hatchet-shaped; compressed, roundish above, and gibbous on the fore side with a sharp edge, and somewhat cylindrical below.
94. *Deltoides*, deltoid; of an irregular rhomboidal figure, of which the two side-angles are nearer the base than the top. See the leaf of the black Poplar.
95. *Triquetrum*, prismatical, or having three plain sides.
96. *Canaliculatum*, channelled, or having a deep longitudinal furrow.
97. *Sulcatum*, having more deep furrows than one.
98. *Teres*, cylindrical.

Plate LXII. 99. *Binatum*, binate, or having a simple petiole with two leaves connected to its apex.

100. *Ternatum foliis petiolatis*, ternated with sessile feuillets; or having three sessile leaves (*i. e.* without petioles) connected to the apex of one common petiole.
101. *Ternatum foliis petiolatis*, ternated with petiolated feuillets, or having three leaves upon a common petiole, and each of these having at the same time a petiole of its own.
102. *Digitatum*, digitated, fingered, *i. e.* when a simple petiole has two, three, four, or more leaves connected to its apex.
103. *Pedatum*, pedated; having a bifid or forked petiole, with two or more small leaves connected to the interior side of the forks.
104. *Pinnatum cum impari*, pinnated with an odd feuillet, or small leaf, at the top.
105. *Pinnatum abruptè*, abruptly pinnated, or pinnated without any odd leaf or cirrus at the top.
106. ——— *alternatim*, pinnated alternately, or having the feuillets placed alternately on each side of the petiole.
107. ——— *interruptè*, pinnated with the feuillets alternately larger and smaller.
108. ——— *cirrhosum*, pinnated with a cirrus or clasper at the end of the petiole.
109. ——— *conjugatum*, pinnated with only two feuillets.
110. ——— *decurvè*, pinnated with feuillets running down the sides of the petiole in the form of a web or membrane.
111. ——— *articulatè*, pinnated with an articulated or jointed petiole.
112. *Lyratum*, lyre-shaped; *i. e.* divided transversely into oblong horizontal segments, of which the lower ones are lesser and more distant from each other than the upper ones.
113. *Biternatum*, or *duplicato-ternatum*, biternate, or double-ternate, or having three ternated (100) leaves upon one petiole. See Epimedium.
114. *Bipinnatum*, or *duplicato-pinnatum*, bipinnated, or

Fig.

- double pinnated, *i. e.* having the primary pinnæ pinnated again a second time.
115. *Triterdatum*, or *triplicato-ternatum*, triple ternated, or consisting of three biternated (113) leaves.
116. *Trippinnatum sine impari*, triple-pinnated without an odd feuillet, or having the secondary pinnæ pinnated again, and these last pinnæ not terminated by an odd feuillet.
117. ——— *cum impari*, triple-pinnated with an odd feuillet.

TERMS respecting the Determination of Leaves.

118. *Inflexum*, incurved; bending upwards, with the point leaning towards the stem.
119. *Erectum*, erect; upright, or making a very acute angle with the stem.
120. *Patens*, patent; forming any angle with the stem greater than the former and less than half a right angle.
121. *Horizontale*, horizontal, or standing at a right angle with the stem.
122. *Reclinatum*, or *reflexum*, reclined or reflex, bending down arch-wise till the apex be lower than the base.
123. *Revolutum*, revolute, or rolled backwards in a spiral form.
124. *Seminale*, seminal leaves, or seed-leaves; *i. e.* the lobes of the seed, which in many plants arise entirely out of the ground, are always the first that appear, and generally of a form or consistency different from those that succeed them.
125. *Caulinum*, cauline, or rising immediately from the stem or stalk.
126. *Rameum*, a branch-leaf, or rising out of a branch.
127. *Florale*, floral; leaf next the flower, and differing in its form from the other leaves of the plant. This is also termed a *bractea*, or *spangle*.
128. *Peltatum*, peltated; or having the petiole inserted not into the base, but into the inferior disc, at or near its centre.
129. *Petiolatum*, petiolated; connected with the plant by a petiole, or foot-stalk, inserted into the margin of its base.
130. *Sessile*, sessile; or connected immediately with the plant, without the intervention of a petiole.
131. *Decurrens*, decurrent, or having its base running down along the stalk; as in the Verbena, Carduus, &c.
132. *Amplexicaule*, amplexicaule; embracing the stalk on all sides with its base.
133. *Perfoliatum*, perfoliate; having its base entirely surrounding the stalk, or the stalk perforating, or appearing to perforate it. See the Thoroughwax.
134. *Connatum*, connate; having its base united, or so close to its opposite as to form, or appear to form, with it but a single leaf, with the stem rising up through it.
135. *Vaginant*, sheathing, or with its base forming a cylindrical tube enveloping the stem. See Polygonum; Rumex.
136. *Articulatum*, articulated, or jointed, having one leaf growing out of the top of another.
137. *Stellatum*, stellate, or verticillated, when more than two leaves surround the stem at the same height like

Fig.

like a whirl.

138. *Quaterna, quina, sena*, &c. are only different species of stellated, or verticillated leaves, when there are four, five, six, &c. leaves in one verticillus or whirl.
139. *Opposita*, opposite; or when two leaves stand exactly opposite to each other, and each pair stands at right angles with the pairs immediately above and below it.
140. *Alternæ*, alternate, or rising one above another by degrees.
141. *Acerosa*, linear and perfoliating; as in the Pine, Fir, Juniper, and Yew.
142. *Imbricata*, imbricated; erect, and so thick set as partly to cover one another like tiles or slates on a roof.
143. *Fasciculata*, fasciculated, or rising in a pencil from the same point; as in the Larix.
144. *Frons*. This term is applied to a species of stalk or trunk, consisting of branches and leaves, and sometimes the fructifications, all united together; and is peculiar to the Filices or Ferns, and the Palmæ.
145. *Folium spatulatum*, (Sauv.) spatulated, or roundish above, with a long linear base.
146. — *parabolicum*, parabolic; having its longitudinal diameter longer than the transverse, and growing narrower from the base till it terminate somewhat like an oval.

TERMS relating to the *Caulis* or *Stems*. Plate LXIII.

147. *Culmus squamosus*, a scaly culm or stalk. *Culmus* is peculiarly appropriated to corns and grasses.
148. *Caulis repens*, a repent or creeping stalk or stem, giving out small roots here and there as it runs along the surface of the ground or upon another plant. *Caulis* is appropriated to denote the trunk of an herbaceous plant.
149. *Scapus*, is a species of trunk, which supports the parts of fructification, but has no leaves. See Narcissus, Pyrola, Convallaria, Hyacinthus.
150. *Culmus articulatus*, a jointed culm (147) or stalk.
151. *Caulis volubilis*, a twining stem, or which ascends by twisting itself like a spiral round the stem or branches of another plant.
152. — *dichotomus*, a dichotomous stem, or which is first divided into two, and each of these divisions into other two, and so on regularly for any number of times.
153. — *brachiatus*; having each pair of branches opposite the one to the other, and standing at right angles with the pairs next them, either above or below; so that, when viewed lengthwise, the whole branches appear to go out at right angles four different ways.

TERMS relating to the *Fulcra* or *Supports of Plants*.

154. a, *Cirrhus*, a clasper, tendril, or spiral thread, by which a plant fixes itself to any other body. b, *Stipule*, or little scales at the base of the petiole, or foot-stalk of the leaf, or at the base of the peduncle, or flower-stalk. c, *Glandule concavæ*, small hollow glands for the secretion of some particular fluid.
155. a, *Glandule pedicellate*, small pedicellate glands.
156. a, *Bractea*, a spangle, or flower-leaf, differing

Fig.

from the other leaves of the plant.

157. a, *Spina simplex*, a simple or one-pointed spine. b, *Spina triplex*, a triple or three-pointed spine. *Spina* is appropriated to such spines or sharp points as are protruded from the wood or inner substance of the plant.
158. *Aculeus simplex*, a simple or one-pointed prickle. An aculeus, or prickle, differs from a spine in being only fixed to the bark, and not protruded from the wood or internal substance.
159. *Aculeus triplex*, a triple or three-pointed prickle.
160. *Folia opposita*, opposite leaves. a, the *Axilla*, or angle between the leaf and the stalk.

TERMS relating to the *Roots*.

161. *Bulbus squamosus*, a scaly bulb, or a root composed of scales imbricated, or lying over one another; as in that of the White Lily.
162. — *solidus*, a solid bulb, or of one uniform substance throughout; as in the Hyacinth.
163. — *tunicatus*, a tunicated or coated bulb, or consisting of coats lying above one another; as in the Onion.
164. *Radix tuberosa*, a tuberous root, or consisting of many little knots, or roundish bodies, collected into a bunch; as in the Filipendula.
165. — *fusiformis*, fusiform, or spindle-shaped; i. e. oblong, thick, and tapering downwards; as in the Carrot, and Parsnip.
166. — *ramosa*, a branchy root, or which is divided into many lateral branches.
167. — *repens*, a repent or creeping root, or which runs out to a great length, and sends off small roots at different distances.

These are the principal terms necessary for understanding Linnæus's description of the specific characters of plants.—To make the reader acquainted with the manner in which these terms are used, we shall give a few examples.

Class II. DIANDRIA.

Order, MONOGYNIA.

Genus, VERONICA, or SPEEDWELL

Species, *Veronica arvensis*, has solitary flowers; cut, sessile (130), and cordated (46) leaves.

Veronica agrestis, has solitary flowers; cut, cordated (46), and petiolated (129) leaves.

Class XVI. MONODELPHIA.

Order, POLYGINIA.

Genus, MALVA, or MALLOW.

Species, *Malva spicata*, has tomentose (84), crenated (74), and cordated (46) leaves, and oblong hairy spicæ (34).

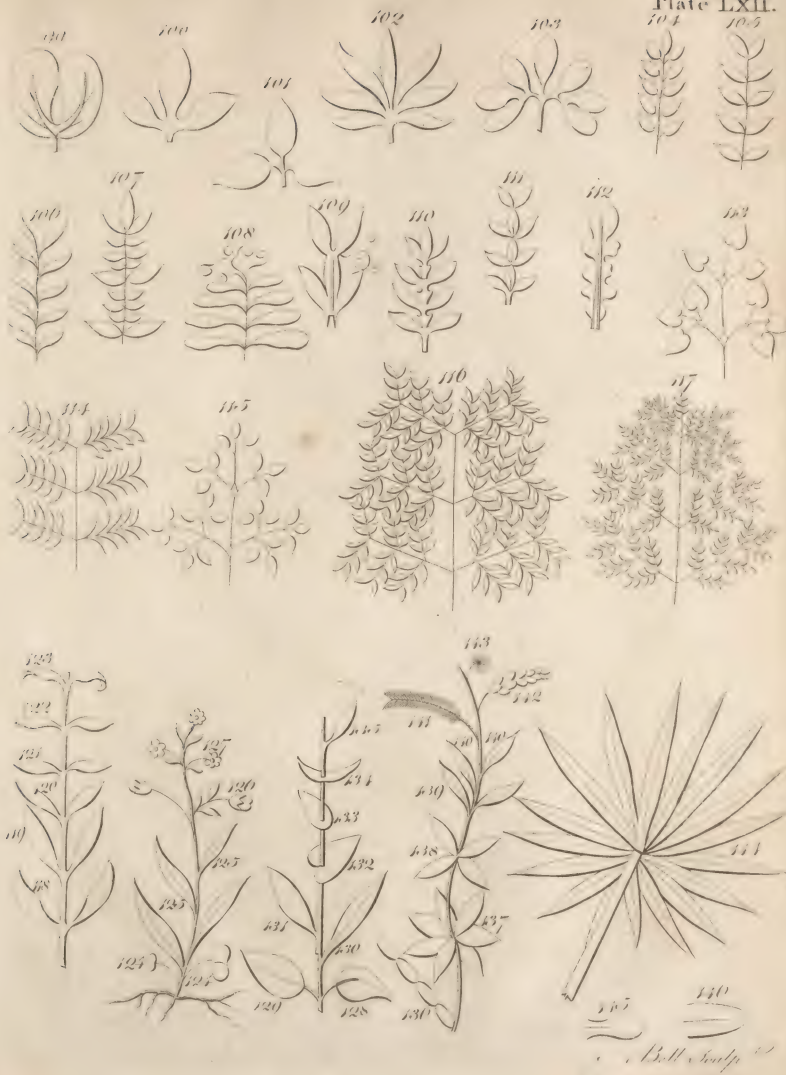
Malva sylvestris, has an erect (119) herbaceous caulis (148), with acute (74), seven-lobed (50) leaves, and hairy pedunculi and petioli (129).

Class XIX. SYNGENESIA.

Order, POLYGAMIA ÆQUALIS.

Genus, CARDUUS, or THISTLE.

Species, *Carduus helenioides*, or *melancholy thistle*, has













has lanceolated (42), toothed (66), amplexicaule (132) leaves; with unequal, ciliated (86), small spines (157).

Class XXIV. CRYPTOGAMIA.
Order, FILICES.
Genus, ASPLENIUM, or MAIDENHAIR.
Species, *Asplenium trichomanes*, has a pinnated (104) frons (144); the pinnae are roundish (38) and crenated (74).

To these examples we shall add a complete description of a plant reduced to its class, order, genus, and species, with figures of all the parts necessary for that purpose.

Plate LXIV RHEUM PALMATUM, or True Rhubarb.

The flower of this plant has no CALIX.

The COROLLA *dd*, consists of one petal, narrower at the base, not perforated, and divided in the margin into six obtuse segments, one less and one larger alternately; the petal is marcescent, *i. e.* decays, but does not fall off till the seeds be ripe.

The STAMINA *ee*, consist of nine capillary filaments inserted into the corolla, and about the same length with it. The *antheræ* are didymous, (*i. e.* appear to be double), oblong, and obtuse.

The PISTILLUM *f*, has a short three-sided germen. It can hardly be said to have any styli; but has three reflected plumose stigmata.

The PERICARPium is wanting.

Each flower contains but one large, three-sided, acute seed *g*, with a membranaceous edge.

The number of stamina determines this plant to belong to the ENNEANDRIA Class; and the number of STIGMATA fixes its Order to be TRIGYNIA. The other parts of the above description clearly demonstrate the genus to be the Rheum or Rubarb, and sufficiently distinguish it from the Laurus, Tinus, Cassia, and Butomus; the only other genera belonging to this class.

The SPECIFIC mark is taken from the leaves, which are PALMATE (58), and sharp and tapering at the points. There are but five species of Rheum, none of whose leaves are palmated, except the species now described.

SECT. V. Of the Sexes of Plants.

As many philosophers and botanists deny that such a thing as the distinction of sexes takes place in vegetables, it will be necessary to give a narration of the arguments employed by both parties on this subject. We shall begin with the arguments in favour of the sexes.

I. Linnæus is at great pains in tracing the notion of sexes in plants to the remotest periods of antiquity. He informs us, that Empedocles, Anaxagoras, and other ancient philosophers, not only attributed the distinction of sexes to plants, but maintained that they were capable of perceiving pleasure and pain.

Hippocrates and Theophrastus are next introduced as distinguishing the conyzæ, the abies, the filix, &c. into male and female. The latter of these writers affirms that the fruit of the male palm will not germinate, unless the pollen of the male be shaken over the spathe of the female previous to the ripening of the seed.

Dioscorides takes notice of a male and female mandragora, mercurialis, cistus, &c.

Pliny does not confine his views of sex to animals; but exclaims, that every thing this earth produces is characterized by the distinction of sex.

From the days of Pliny to those of Cæsalpinus, who lived in the 16th century, the analogy between the vegetable and animal seems to have been entirely neglected. Cæsalpinus tells us, that the males of the oxycedrus, taxus, mercurialis, urtica, and cannabis, are barren; and that the females of these plants only bear fruit.

After Cæsalpinus, we find Dr Grew and Sir Thomas Millington engaged in a conversation concerning the utility of the stamina and styli of plants. The result of this conversation was the mutual agreement of these two eminent naturalists, that the stamina and styli of vegetables were analogous to the organs of generation in animals, and that they were adapted by nature to answer the same purposes. Dr Grew in his anatomy of plants, after enumerating the analogies between plants and animals, concludes, that the pollen probably emits certain *viscife* effluvia, which may serve for the impregnation of the seeds.

Mr Ray gave a further sanction to the doctrine of sexes, by concurring with Grew, and adding some further illustrations from analogy.

In the year 1695, Camerarius attempted to prove the sexes of plants. But, as he trusted solely to the palm-tree, and without seemed to be doubtful as to the authenticity of the fact, he cannot be considered as having done any thing in confirmation of the sexual hypothesis.

Mr Morland, in the year 1703, adopted the same hypothesis; but gave it a new modification, by supposing that the pollen contained the feminal plant in miniature, and consequently that one pollen at least behoved to be conveyed into every separate seed before it could be properly impregnated. Analogy and the structure of the parts are the only arguments he employs.

Some years after this, Mr Geoffroy wrote a treatise on the sexes of plants; but as he advanced nothing new, we shall take no further notice of him.

Vaillant, in the year 1717, judiciously considering that the canal in the stylus of most plants was too narrow to admit the pollen itself, republished Dr Grew's theory of impregnation by means of a subtil feminal aura.

These are the sentiments of the principal botanists with regard to the generation of plants, till the celebrated Linnæus made his appearance as a botanical writer, who has extended the idea so far as to compose a complete system upon it.

Although Linnæus can have no claim to the supposed discovery of the sexual hypothesis, his being precisely the same with that of Dr Grew; yet, as he is the chief supporter and improver of this doctrine, we shall give a succinct narration of the arguments he makes use of in order to prove that vegetables propagate their species by a regular commerce of sexes.

In a treatise, intitled *Sponsalia Plantarum*, published as an inaugural dissertation by Wahlbom, in the first volume of the *Annuitates Academicæ*, all the arguments made use of by Linnæus in his *Fundamenta Botanica* and other works, are collected and arranged in one view. But as Wahlbom honestly attributes all the me-

rit of this dissertation to his great master, we shall here drop his name altogether, and give the arguments as the property of Linnæus, by whom they were originally employed.

Linnæus, then, first attempts to show, that vegetables are endowed with a certain degree of life; and, secondly, that they propagate their species in a manner similar to that of animals.

"That vegetables are really living beings, (says he), must be obvious at first sight; because they possess all the properties contained in that accurate definition of life laid down by the great Dr Harvey, namely, *Vita est spontanea propulsio humorum*. But universal experience teaches, that vegetables propel humours or juices: hence it is plain that vegetables must be endowed with a certain degree of life."

Not trutting solely to a fyllogism founded on a definition, Linnæus proceeds to support the life of vegetables by arguments drawn from the following particulars in their economy; the first of which he intitles

"*Nutritio*.—The very idea of nutrition implies a propulion of humours, and, of course, the idea of life. But vegetables derive their nourishment from the earth, air, &c. and consequently must be considered as living creatures.

"2. *Ætas*.—Every animal must not only begin to exist, and have that existence dissolved by death, but must likewise pass through a number of intermediate changes in its appearance and affections. *Infancy, youth, manhood, old age*, are characterised by *imbecility, beauty, fertility, dotage*; are not all these vicissitudes conspicuous in the vegetable world? Weak and tender in *infancy*; beautiful, and salacious in *youth*; grave, robust, and fruitful, in *manhood*; and when *old age* approaches, the head droops, the springs of life dry up, and, in fine, the poor tottering vegetable returns to that dust from whence it sprung:

"3. *Motus*.—No inanimate body is capable of self-motion. Whatever moves spontaneously, is endowed with a living principle: for motion depends on the spontaneous propulion of humours; and where-ever there is a spontaneous propulion of humours, there also is life. That vegetables are capable of motion, is evident from the following facts: plants, when confined within doors, always bend towards the light, and some of them even attempt to make their escape by the windows. The flowers of many plants, especially those of the syngenesia class, pursue the sun from east to west, rejoicing in his beams. Who then can deny that vegetables are possessed of living and self-moving powers?

"4. *Morbus*.—The term *disease* means nothing more than a certain corruption of life. It is well known, that vegetables are subject to diseases, as well as animals: when over-heated, they turn thrifty, languish, and fall to the ground; when too cold, they are tormented with the chilblain, and not unfrequently *expire*: they are sometimes afflicted with cancers; and every plant is infested with lice peculiar to its species.

"5. *Mors*.—Death is opposed to life, the former being only a privation of the latter. Experience shows, that every living creature must die. But, as vegetables are daily cut off by internal diseases and external injuries; as they are subject to death from the attacks of hunger, thirst, heat, cold, &c. with what propriety could vegetables be thus said to *die*, unless we allow

that they previously *lived*?

"6. *Anatomia*.—Under this article we are referred to Malpighius and Grew for the organic fibres, membranes, canals, vesicles, &c. of plants, as additional proofs of their living powers.

"7. *Organizatio*.—Vegetables not only propel humours, but also prepare and secrete a number of different juices for the fruit, the nectar, &c. analogous to the various secretions in animal bodies."

From these facts and observations, Linnæus concludes, that plants are unquestionably endowed with life as well as animals; and then proceeds in the following manner to show how these animated vegetables propagate their species.

After discussing the long exploded doctrine of equivocal generation, he lays hold of another maxim of Dr Harvey, *viz. Omne vivum ex ovo*.—"It being fully evident, (says he), from the foregoing chain of reasoning, that vegetables are endowed with life, it necessarily follows, agreeable to this maxim of Harvey's, that every vegetable must in like manner derive its existence from an *egg*. But as vegetables proceed from eggs, and as it is the distinguishing property of an egg to give birth to a being similar to that which produced it, the seeds must of course be the *eggs* of vegetables.

"Granting then that the seeds of vegetables are intended by nature to answer the same end as the eggs of animals, and considering at the same time that no egg can be fecundated without receiving an impregnation from the male, it follows, that the seed or eggs of vegetables cannot be fecundated by any other means. Hence also the necessity of vegetables being provided with organs of generation. But where are these organs situated? The answer is easy:—We have already found impregnated seeds within the flowers of plants; and it is natural to expect that the *genitalia* should not be at a greater distance. Now, as *copulation* always precedes *birth*, and every *flower* precedes the *fruit*, the *generating faculty* must be ascribed to the *flower*, and the *birth* to the *fruit*. Again, as the *antheræ* and *stigmata* are the only essential parts of flowers, these parts must necessarily be the *organs of generation*."

Being thus far advanced, Linnæus affirms, that the *antheræ* are the *testes*, and that the pollen performs the office of the male *semen*. These affirmations he attempts to establish by the following arguments; the first of which he terms,

"1. *Præcedentia*.—The antheræ, or vegetable testes, always precede the fruit; and as soon as the antheræ come to maturity, which constantly happens before the maturity of the fruit, they continue to throw out their pollen as long as the flower lasts; but decay and fall off whenever the fruit comes to perfection.

"2. *Situs*.—The antheræ of all plants are uniformly situate in such a manner that the pollen may with the greatest facility fall upon the stigma or female organ.

"3. *Tempus*.—The antheræ and stigmata always flourish at the same time, whether the flowers be of the hermaphrodite or dioicous kind.

"4. *Locamenta*.—When the antheræ are dissected, they discover as great a variety of structure as the pericarpia or seed capsules: for some of them have one cell, as the mercury; some two, as the hellebore, &c.

"5. *Castratio*.—If all the antheræ be cut off from an hermaphrodite plant, just before the flowers begin to expand

expand, taking care at the same time that no plant of the same species grows near it, the fruit will either prove entirely abortive, or produce barren seeds.

“ 6. *Figura*.—When the pollen of different plants is examined by the microscope, it exhibits as great a variety of figures as is discoverable in the seeds themselves.

“ The accumulated force of these arguments (concludes Linnæus) amounts to a full demonstration that the antheræ are the testes, and that the pollen is the semen or genitura, of vegetables.

“ The male organ being thus investigated, we hope, (says Linnæus), that none will hesitate to pronounce the stigma to be the female organ, especially when the following observations are sufficiently attended to.

“ The pistillum is composed of the germen, stylus, and stigma. The germen, being only a kind of rudiment of the future fetus or seed, ceases to exist as soon as the flower comes to maturity. Neither is the stylus an essential part, as many flowers have no stylus. But no fruit ever comes to maturity without the assistance of the stigma. It follows, that the stigma must be the female organ adapted by nature for the reception of the pollen or impregnating substance. This will appear still clearer from the following chain of reasoning.

“ 1. *Situs*.—The stigmata are always situated so that the pollen may with most ease fall upon them. Besides, it is remarkable, that in most plants (though not in all) the number of the stigmata exactly corresponds with the loculements or cells of the pericarpium.

“ 2. *Tempus*.—Here the observation, that the stigmata and antheræ constantly flourish at the same time, is repeated.

“ 3. *Decidentia*.—The stigmata of most plants, like the antheræ, decay and fall off as soon as they have discharged their proper function; which evidently shows, that their office is not to ripen the fruit, but solely to answer the important purpose of impregnation.

“ 4. *Abscissio*.—The argument here is precisely the same with the castration of the antheræ; and the result is likewise the same, namely, the destruction of the fruit.

“ These arguments (concludes Linnæus) are sufficient to demonstrate, that the stigma is the female organ of generation, or that organ which is suited for the reception and conveyance of the semen to the vegetable eggs. Hence, plants may be said to be *in actu venenis*, when the antheræ, or testicles, spread their pollen over the stigma or female vulva.”

To show how the coitus of vegetables is effected, is our author's next object of investigation. He affirms, that the pollen is conveyed, by means of the wind or insects, to the moist stigma, where it remains until it discharges a subtle fluid, which being absorbed by the vessels of the stigma, is carried to the seeds or ova, and impregnates them. His proofs are taken from the following particulars.

“ 1. *Oculus*.—When the flowers are in full blow, and the pollen flying about, every one may then see the pollen adhering to the stigma. This he illustrates by mentioning as examples the *viola tricolor*, *iris*, *campanula*, &c.

“ 2. *Proportio*.—The stamina and pistilla, in most plants, are of equal heights, that the pollen, by the intervention of the wind, may, with the greater facility,

fall upon the stigma.

“ 3. *Locus*.—The stamina of most plants surround the pistillum, to give the pollen an opportunity of falling upon the stigma at every breeze of wind. Even in the monœcia class, the male flowers stand generally above the female ones, to afford an easier conveyance of the pollen to the stigma.

“ 4. *Tempus*.—It is remarkable that the stamina and pistilla constantly appear at the same time, even in plants belonging to the monœcia class.

“ 5. *Pluvie*.—The flowers of most plants expand by the heat of the sun, and shut themselves up in the evening or in rainy weather. The final cause of this must be to keep the moisture from the pollen, lest it should be thereby coagulated, and of course prevented from being blown upon the stigma.

“ 6. *Palmicole*.—That the cultivators of palm-trees were in use to pull off the spadices from the males, and suspend them over the spathe of the females, is attested by Theophrastus, Pliny, Prosper Alpinus, Kempfer, and many others. If this operation happened to be neglected, the dates were four and destitute of nuts. Kempfer adds this singular circumstance, that the male spadix, after being thoroughly dried and kept till next season, still retained its impregnating virtue.

“ 7. *Flores nutantes*.—As the pollen is specifically heavier than air, such flowers as have their pistillum longer than the stamina, hang down, or incline to one side, *e. g.* the *fritillaria*, *campanula*, &c. An easy admission of the pollen to the stigma is the final cause of this appearance.

“ 8. *Submersi*.—Many plants that grow below water, emerge when their flowers begin to blow, and swim upon the surface till they receive their impregnation, and then sink down.

“ 9. *Omnium forum genuina consideratio*.—Here a number of particulars are recited. We shall confine ourselves to those that are most striking and applicable to the subject.

“ When the flowers of the male hemp are pulled off before those of the female are fully expanded, the females do not produce fertile seeds. But as a male flower is sometimes found upon a female plant, this may be the reason why fertile seeds are sometimes produced even after this precaution has been observed.

“ The tulip affords another experiment to the same purpose.—Cut off all the antheræ of a red tulip before the pollen is emitted; then take the ripe antheræ of a white tulip, and throw the pollen of the white one upon the stigma of the red; the seeds of the red tulip being thus impregnated by one of a different complexion, will next season produce some red, some white, but most variegated flowers.”

In the year 1744, Linnæus published a description of a new genus, which he called *peloria*, on the supposition of its being a *hybrid* or *mule* plant, *i. e.* a plant produced by an unnatural commixture of two different genera. The root, leaves, caulis, &c. of this plant are exceedingly similar to those of the *antirrhinum linaria*; but the flower and other parts of the fructification are totally different. On account of its similarity to the *linaria* in every part but the flower, Linnæus imagined it to have been produced by a fortuitous commixture of the *linaria* with some other plant, although he has never yet been able to point out the father. This doctrine

of the production of *mule* plants has since been greatly prized and carefully propagated by Linnæus and the other supporters of the sexual hypothesis. In the third volume of the *Annuitates Academicae*, there is a complete dissertation, intitled *Plantæ Hybridae*, wherein the doctrine of *vegetable mules* is much improved and extended. This dissertation contains a list of 47 mules, with their supposed fathers and mothers. For example,

The *VERONICA SPURIA* is said to be a *mule* plant *begot* by the *verberna officinalis* upon the *veronica maritima*.

The *delphinium hybridum*, a *mule* *begot* by the *aconitum napellus* upon the *delphinium elatum*.

The *arctotis calendula*, a *mule* *begot* by the *calendula pluvialis* upon the *arctotis trifida*.

The *asclepias nigra*, a *mule* *begot* by the *cynanchum acutum* upon the *asclepias vincetoxicum*, &c.

From the examples given in this dissertation, Linnæus draws this conclusion, that only two species of each genus existed *ab origine*; and that all the variety of species which now appear have been produced by unnatural embraces betwixt species of different genera.

Under this head, Linnæus likewise quotes from Ray the story of Richard Baal gardener at Brentford. This Baal sold a large quantity of the seeds of the *brassica florida* to several gardeners in the suburbs of London. These gardeners, after sowing their seeds in the usual manner, were surprised to find them turn out to be plants of a different species from that which Baal made them believe they had purchased; for, instead of the *brassica florida*, the plants turned out to be the *brassica longifolia*. The gardeners, upon making the discovery, commenced a prosecution of fraud against Baal in Westminster-hall. The court found Baal guilty of fraud, and decreed him not only to restore the price of the seeds, but likewise to pay the gardeners for their lost time, and the use of their ground. "Had these judges (says Linnæus) been acquainted with the sexual hypothesis, they would not have found Baal guilty of any crime, but would have ascribed the accident to the fortuitous impregnation of the *brassica florida* by the pollen of the *brassica longifolia*."

Linnæus next proceeds to celebrate the utility of insects, because they convey the pollen of the male to the stigma of the female. "In this way, (says he), it is reasonable to think that many dioecious plants are impregnated. Nay, even the hermaphrodites themselves are greatly obliged to the different tribes of insects, which, by fluttering and treading in the corolla, are constantly scattering the pollen about the stigma."

"Upon the whole, then, (concludes Linnæus), the coitus of vegetables is evident to a demonstration. This coitus is nothing more than the conveyance of the pollen to the stigma, to which it adheres till it bursts and discharges a subtile elastic fluid. This fluid or aura is absorbed by the vessels of the stylus, and carried directly to the ovary or germen, where the mysterious work of impregnation is fully completed."

THESE are the arguments employed by Linnæus and other advocates for the sexual commerce of vegetables.—Let us next attend to those employed by the opposers of this hypothesis.

It is admitted by Ponteder, Dr Allston, &c. that

some of the ancients applied the terms *male* and *female* to several plants. But then they deny that these terms conveyed the same ideas to the ancients that they do to the moderns. *Male* and *female*, when applied to plants, were to the ancients mere terms of distinction, serving only as trivial names to distinguish one species or variety from another. The ancients were ignorant of the very characters which constitute the difference between what is called a *male* and *female* plant among the moderns. Theophrastus, Dioscorides, Pliny, and, in a word, the whole ancient botanical writers, confound the very notion of the modern sexes: they call the real female, or seed-bearing plant, the *male*; and the male, or barren plant, the *female*. Nay, they have even applied the terms *male* and *female* to many plants which bear nothing but hermaphrodite flowers.

Such is the nature of this controversy, that it cannot be determined with any degree of certainty, but by experiments made upon dioecious plants. If a female plant can produce fertile seeds without having any communication with the pollen of the male, the use of this pollen with respect to the impregnation of seeds must of necessity be entirely superfluous.

Now, both Camerarius and Dr Allston tried these experiments with the same success. Those two eminent botanists took female plants of the mercury, spinage, and hemp; transplanted them at a great distance from any males of the same genus, and besides had them inclosed by double rows of hedges. The result was, that each of these plants produced great quantities of fertile seeds. Tournfort made the same trial upon the lupulus, Miller upon the bryony, and Geoffroy upon the may; and all of them declare that the seeds of these plants were as fertile as if they had been surrounded by a thousand males.

Linnæus, in his first argument for the coitus of plants, refers every man to the evidence of his senses.

"Do we not see (says he) the stigma of almost every hermaphrodite flower covered over with the pollen or impregnating substance? Do not we see the *parietaria*, the *urtica*, &c. by violent explosions, discharging their pollen in the open air, that it may be carried in that vehicle to the stigmata of their respective females?"—All this is admitted by the opposers of the sexes: but then they deny that these explosions, &c. are intended to create any intercourse between the male and the female; and further allege, that this ejection of the pollen is intended by nature to throw off something excrementitious, or at least something which, if retained, would prove noxious to the fructification.

Linnæus takes his second argument from the proportion which the stamina bear to the stylus, alleging that they are generally of the same height.—This observation (say the anti-sexualists) is not only contrary to experience, but, allowing it to be universal, no conclusion can be drawn from it either for or against the sexual hypothesis.

The third argument is taken from the *locus* or situation of the stamina with respect to the stylus: "and as the male flowers in the monœcia class stand always above the female flowers, it must be concluded (says Linnæus) that the intention of nature, in this disposition of the parts, is to allow a free and easy access of the pollen to the stigma.—But the stamina cannot be said to surround the pistillum in the monandria and diandria

andria classes: and the position of the male flowers in the monœcia class is a mere chimæra; for in the ricinus, one of the examples which Linnæus mentions in confirmation of his doctrine, the female flowers stand uniformly some inches above the males.

That the stamina and pistilla generally come to perfection at the same time, and that this happens even in the dioicous plants, is Linnæus's fourth argument. But, as it is acknowledged by Linnæus himself, that there are many exceptions with respect to this fact, the opposers of the sexual hypothesis allege that it carries the best answer in its own bosom.

The fifth argument is founded on the circumstance of some flowers shutting up their petals in rainy or moist evenings.—But many flowers do not shut themselves up, either in the night or moist weather, as the passion-flower, &c. The *lychnis noctiflora*, *mirabilis peruviana*, &c. open their flowers in the night, and shut them at the approach of the sun. Hence this is another final cause (say the anti-sexualists) perverted to support a favourite hypothesis.

We come now to the culture of the palm-tree, which is the sixth and most plausible argument employed by the sexualists. Of this, the most authentic account we have is the following by Dr Hasselquist, in one of his letters to Linnæus, dated Alexandria May 18th, 1750. "The first thing I did after my arrival was to see the date-tree, the ornament and a great part of the riches of this country. It had already blossomed; but I had, nevertheless, the pleasure of seeing how the Arabs assist its fecundation, and by that means secure to themselves a plentiful harvest of a vegetable, which was so important to them, and known to them many centuries before any botanist dreamed of the difference of sexes in vegetables. The gardener informed me of this before I had time to inquire; and would shew me, as a very curious thing, the male and female of the date or palm-trees: nor could he conceive how I, a Frank, lately arrived, could know it before; for, says he, all who have yet come from Europe to see this country, have regarded this relation either as a fable or miracle. The Arab seeing me inclined to be further informed, accompanied me and my French interpreter to a palm-tree, which was very full of young fruit, and had by him been wedded or fecundated with the male when both were in blossom. This the Arabs do in the following manner: When the spadix has female flowers, that come out of its spathe, they search on a tree that has male flowers, which they know by experience, for a spadix which has not yet burst out of its spathe: this they open, take out the spadix, and cut it lengthwise in several pieces, but take care not to hurt the flowers. A piece of this spadix with male flowers they put lengthwise between the small branches of the spadix which hath female flowers, and then lay the leaf of a palm over the branches. In this situation I yet saw the greatest part of the spadices which bore their young fruit; but the male flowers which were put between were withered. The Arab besides gave me the following anecdotes: First, unless they, in this manner, wed and fecundate the date-tree, it bears no fruit. Secondly, they always take the precaution to preserve some unopened spathe with male flowers from one year to another, to be applied for this purpose, in case the male flowers should miscarry or suffer damage. Third-

ly, if they permit the spadix of the male flowers to burst or come out, it becomes useless for fecundation: it must have its *maidenhead*, (these were the words of the Arab), which is lost in the same moment the blossoms burst out of their case. Therefore the person who cultivates date-trees must be careful to hit the right time of assisting their fecundation, which is almost the only artifice in their cultivation. Fourthly, on opening the spathe, he finds all the male flowers full of a liquid which resembles the finest dew; it is of a sweet and pleasant taste, resembling much the taste of fresh dates, but much more refined and aromatic: this was likewise confirmed by my interpreter, who hath lived 32 years in Egypt, and therefore had opportunities enough of tasting both the nectar of the blossoms, and the fresh dates."

Now, though this account seems fully to confirm the fact, viz. that such a practice obtains among the Arabs, and that they assert its efficacy in fecundating the trees, it is certain (say the opposers of this doctrine) that no intelligent person, who is not already wedded to an hypothesis, will attempt to found an argument upon the assertions of a people so full of ridiculous superstitions. Before Dr Hasselquist, or any other person, can draw any argument from the abovementioned account, he ought to see the experiment several times repeated, with his own eyes, and not take it upon the word of a people who, besides their superstition, may very probably find it their interest to impose upon travellers.

Mr Milne, author of the Botanical Dictionary, however, relates an experiment, near akin to the abovementioned, which merits some attention: "In the garden of M. de la Serre, of the Rue S. Jacques at Paris, was a female turpentine tree, which flowered every year, without furnishing any fruit capable of vegetation. This was a sensible mortification to the owner, who greatly desired to have the tree increased. Messieurs Duhamel and Jusieu very properly judged that they might procure him that pleasure by the assistance of a male pistachio tree. They sent him one very much loaded with flowers. It was planted in the garden of M. de la Serre, very near the female turpentine tree, which the same year produced a great quantity of fruits, that were well-conditioned, and rose with facility. The male plant was then removed; the consequence of which was, that the turpentine-tree of M. de la Serre in none of the succeeding years bore any fruit that, upon examination, was found to germinate."

Upon this experiment it is observed by the antifexualists, that, though it were a thousand times repeated, it never could be decisive. The nature of the controversy, say they, is such, that one experiment is more decisive in favour of their opinion, than 10,000 can be against it. The reason is plain: If there is such a thing as a sexual intercourse in vegetables, it is as wonderful that any seeds should be perfected without that intercourse, as that a virgin should have a child; the last is not in the least more extraordinary than the first. One experiment, therefore, which shews that seeds may be perfected without such sexual intercourse, is either to be resolved into a miracle, or must prove absolutely decisive against the sexual system; while numberless experiments such as that abovementioned could prove no-

thing, because we know not what effect vegetables may have by growing in each others neighbourhood, independent of any sexual intercourse.

In Milne's Botanical Dictionary, under the article *Sexus Plantarum*, the author quotes Dr Allston's experiments partially. The facts recorded by Dr Allston are as follow. 1. Three sets of spinach, planted at a great distance from each other, proved all of them fertile, and ripened plenty of seeds, which were found to answer as well as others spinach feed. 2. A plant of hemp growing by itself, being taken care of, produced about 30 good feeds, though in a situation very much exposed, and plucked up too soon, on account of bad weather, in the autumn. 3. This experiment, which is the most remarkable of the three, we shall give in the Doctor's own words. "In the spring of 1741, I carried two young seedling plants of the French mercury, long before there was any in, from the city physic-garden, the only place where it was then to be found in this country, to the king's garden at the Abbey; which are more than 700 yards distant from one another, with many high houses, trees, hedges, and part of a high hill, between them; and planted one of them in one inclosure, where it was shaded from the sun the greatest part of the day; and the other in another, 25 yards distant, exposed to the south and west. Both plants ripened fertile seeds; and the last shed them so plentifully, that it proved a troublesome weed for several years, though none of the species was to be found in that garden for more than 20 years preceding."

This experiment Mr Milne hath thought proper not to take any notice of, though he quotes the other two, and on them has the following remark. "The result of these, and such like experiments, can be accounted for, on the principle of the sexes, in no other way than on the supposition that some male flowers have been intermixed with the female, and operated the fecundation in question. This appears the more probable, as only a part of the seeds in the above experiments attained to perfect maturity, so as to be capable of vegetation."

The seventh argument of Linnæus is taken from the *flores nutantes*.—The pistils of these flowers, according to Linnæus, are always longer than the stamina; and nature has assigned them this pendulous posture, that the pollen, which is specifically heavier than air, may the more conveniently fall upon the stigma.—But the pistils of the campanula, lilium, and many other *flores nutantes*, are not longer than the stamina. Besides, granting this were uniformly the case; yet, as the pollen is heavier than air, this posture must of necessity either make the pollen miss the pistillum altogether, or, at any rate, it can only fall upon the back part of the pistil in place of the stigma; and, of course, such a direction would rather tend to frustrate than promote the impregnation of the seed.

The eighth argument is taken from the *plantæ submersæ*, which are said to emerge as soon as their flowers begin to blow, lest the pollen should be coagulated or washed off by the water.—But many submarine and aquatic plants fructify entirely below water; and, supposing they did not, the same argument would equally prove it to be the intention of nature, that the pollen should be blown away by the winds, as that it should be subservient to the impregnation of the seed.

The ninth and last argument is intitled *Omnium florum genuina consideratio*; which (say the antifexualists) is nothing more than a collection of vague observations upon the structure and economy of particular plants, some of them true, others false, but all of them evidently thrust in as supports to a favourite hypothesis.

Thus we have given a short view of the fundamental principles of the sexual system; of the arguments made use of, and the facts adduced to support it: to these we have subjoined the principal arguments brought against it; together with the most noted experiments made by its opposers; and shall now, according to our general plan, leave the reader to determine for himself. Only, before putting a period to this section, we shall beg leave to observe, that, in our humble opinion, the facts hitherto brought in support of the sexual system are, on the one hand, too few, and those not so fully authenticated as could be wished; and, on the other hand, that the experiments adduced by its opposers seem neither to have been made with sufficient accuracy, nor perhaps upon such plants as would have been most proper for determining the point in dispute. In the mean time, we make no doubt but the gentlemen on both sides will continue to make the most exact and careful inquiries and experiments in order to bring it to a final determination; though from the nature of the question itself, as well as the remoteness of place where some of the plants grow that may be thought necessary to be subjected to experiment, and the difficulty of getting access to perform those experiments in a proper manner, it is not improbable that many years may yet elapse before the world be favoured with that determination.

SECT. VI. Of the Natural Method of Classification.

BESIDES all the abovementioned methods of classing and distributing plants into their different orders, genera, &c. which are deduced from the fructification, and are therefore called *artificial*, Linnæus and most other botanists are of opinion that there is a natural method, or nature's system, which we should diligently endeavour to find out. That this system, say they, is no chimera, as some imagine, will appear particularly from hence, That all plants, of what order soever, show an affinity to some others; and thus, as formerly observed, not only the virtues of a great number of species may be ascertained, but we may know with certainty how to find a proper succedaneum for plants which cannot easily be had.—Linnæus divides vegetables into the 59 natural orders following.

1. *Palme*. These are perennial, and mostly of the shrub and tree kind. The stem is in height from 2 to 100 feet and upwards. The roots form a mass of fibres which are commonly simple and without any ramifications. The stem is generally simple, without branches, cylindrical, and composed of strong longitudinal fibres. The leaves, which are a composition of a leaf and a branch, by Linnæus called *frondes*, are of different forms; being sometimes shaped like an umbrella or fan; sometimes singly or doubly winged; the small or partial leaves, which are often three feet in length, being ranged alternately. The branches, or principal leaves, are six, eight, ten, or twelve feet long; the length varying according to the age and size of the plant. They are

are covered at first with a thick brown dust, like those of the ferns. The base of the leaves frequently embraces the greater part of the stem. The flowers are male and female upon the same or different roots; except in stratiotes, which bears hermaphrodite flowers only; and paknetto, in which the flowers are hermaphrodite and male upon distinct roots. The flowers are all disposed in a panicle or diffused spike, except in the hydrocharis, stratiotes, and valisneria; in which they proceed singly from the wings or angles of the leaves. The common calix, in this order, is that termed a *spatha* or *sheath*, and has either one or two valves. The spadix, or head of flowers protruded from the sheath, is generally branched. Each flower is generally furnished with a perianthium or proper flower-cup, consisting of three leaves or divisions that are small and permanent. The petals are three in number, of a substance like leather, and permanent like the leaves of the calix. The flowers of zamia have no petals. The stamina are from 2 to 20 and upwards, cohering slightly at their base. The seed-buds are from one to three in number, placed in the middle of the flower, and supporting a like number of styles which are very short. The seed-vessel is generally a pulpy fruit of the berry or cherry kind, containing one cell filled with fibrous flesh, and covered with a skin which is of a substance like leather. The seeds are in number from one to three in each pulpy fruit, of a hard bony substance, round or oval, and attached by their base to the bottom of the fruit.—These plants, particularly the feeds, are astringent, and of efficacy in dysenteries.

2. *Piperitæ*. These plants are mostly herbaceous and perennial. The stalks of pothos creep along rocks and trees, into which they strike root at certain distances. The greatest height which any of them is known to attain, is 15 feet; the greater part do not exceed three or four. The fleshy roots of many of these plants are extremely acrid when fresh. They lose this pungent quality, however, by being dried, and become of a spongy nature. The smell of many of them is extremely fetid, frequently resembling that of human excrements. The flowers, however, of an Ethiopian dracunculus or arum, and the cover in which they are involved, are said to emit a very fragrant odour. With regard to their virtues, these plants are commonly astringent.

3. *Calamariæ*. In this class the base of the leaf, which embraces the stalk like a glove, has no longitudinal aperture, but is perfectly entire. The stalk is generally triangular, and without knots or joints. The roots of some are long and knotty; in others, they are composed of fleshy fibres which pierce deep into the ground; and in others, of a bulb. The flowers are either hermaphrodite, or male and female upon the same root. The mode of inflorescence in this order is generally a spike; sometimes a capitulum or head. The calix is wanting either a gluma or an amenum. The corolla is wanting. The filaments of the stamina are three in number, short, slender like a hair, and sometimes bristly. The anthers are generally long, slender, and erect. The seed-bud is very small, blunt, and sometimes three-cornered. The style is thread-shaped, and of the length of the sealy calix. The stigmata are generally three in number; slender, hairy, and sometimes permanent. The virtues, uses, and sensible qualities, of this order

of plants are the same with those of the following.

4. *Gramina*. Most of these plants are annual or perennial herbs; some of them creep upon the ground, others are erect. The roots, in the greatest number, are creeping, and emit fibres from each knot or joint; in others they are simply branching and fibrous. The stems and branches are round. The leaves are simple, alternate, entire, very long, and commonly narrow. They form below a sort of sheath, which embraces or surrounds the stem, and is generally cleft or divided on one side through its whole length. The flowers are either hermaphrodite, male and female on the same root, or hermaphrodite and male on the same root. They proceed either singly from the sheath of the leaves, or are formed into a panicle or loose spike. The calix and corolla in this order are not sufficiently ascertained; in some a single scale or husk, in others two, supply the place of both covers; some grasses have four husky scales, two of which serve for the calix, and the other two for the corolla; some have five; others six, four of which constitute the calix, and the other two are termed improperly enough the *husky petals*. The corolla is sometimes composed of one petal with two divisions; and in general the husks of the calix are always placed opposite to those of the corolla. The stamina are generally three in number, and placed irregularly with regard to the situation of the calix and corolla. The anthers are long, furnished with two cells, and slightly attached to the filaments. The seed-bud is placed upon the same receptacle as the calix, corolla, and stamina. The style is generally double, and crowned with a hairy stigma or summit. The seed-vessel is wanting. The seeds are single, oval, and attached below to the bottom of the flower.—The roots of the grasses are opening; such as have an aromatic smell are stomachic; their seeds are mealy, mucilaginous, and nourishing. All the parts of these plants are wholesome.

5. *Tripsoloides*, (from *trier*, three; and *petalum*, a petal). These plants have no very striking characters, and are nearly allied to the grasses. All the genera of this order have not the circumstance expressed in the title.

6. *Ensatæ*. This order, which is very nearly allied to the grasses and liliaceous plants, furnishes a very beautiful collection of perennial herbs, which are of different heights, from one inch to 15 feet. The roots are tuberous or fleshy, and garnished with fibres; the stalks are simple, and commonly flat or compressed on the sides. The leaves are simple, alternate, entire, sword-shaped, and, like the liliaceous plants, form at their origin a sheath or glove, which in the greatest number is cleft or divided through the whole length, except at the base, where it is entire, and embraces the stalk like a ring. The flowers are hermaphrodite, and generally proceed from the summit of the stalks either singly, in an umbel, a spike, or in a panicle. In *pondederia* they proceed from the wings or angles of the leaves either singly or in an umbel. Most of these plants want the perianthium or flower-cup; the flowers burst from a common cover or sheath, termed by Linneus *spatha*, which in this order is frequently permanent. The petals are in number from one to six. The stamina are generally three. The seed-bud is placed sometimes above the flower, sometimes below it. The style is generally single, and crowned with a triple stigma.

stigma. The seed-vessel is a dry capsule, generally of an oblong shape, and opens at three valves, discovering the same number of cells, each inclosing a quantity of roundish seeds.—These plants resemble the liliaceous in their powers and sensible qualities; very few of them, however, are used in medicine.

7. *Orchideæ*. The roots of many of these plants are composed of one or more fleshy tubercles or knobs, attached to the lower part of the stem, and sending forth fibres from the top. Those of orchis bear an obvious resemblance to the scrotum in animals: from which circumstance the genus has derived its name. The leaves are of a moderate size, inscribed with a number of longitudinal nerves or ribs, and without any footstalk. At their origin they form, round the stalk, a kind of sheath, which is long, entire, cylindrical, but not furnished, like the grasses and some other plants, with a crown at top. The flowers are hermaphrodite, and placed at the summit of the stalk either in a spike or in a panicle. The calix is that part termed by Linnæus a *spatha* or *sheath*, that bursting open protrudes a head or cluster of flowers, termed the *spadix*, which have no perianthium or flower-cup. The petals are five in number, and very irregular. The nectarium in this order is remarkably conspicuous; yet so different in the different genera, that Linnæus has employed it for his principal character, or mark of distinction, instead of the root, which had chiefly engaged the attention of former botanists. It has the appearance of a sixth petal. The filaments are always two in number, and placed upon the pistillum or female organ. The antheræ are erect, and generally covered by the upper lip of the nectarium. The seed-bud is either oblong or pillar-shaped, twisted like a screw, and universally placed below the receptacle of the flower. The style is single, very short, and forms one substance with the inner margin of the nectarium. The seed-vessel is generally a capsule with one cavity or cell, and three valves or openings, which are keel-shaped, and open on the angular sides, being jointed both at the bottom and top. The seeds are numerous; very small, like saw-dust; and attached, without footstalks, to a slender receptacle or rib, which extends itself lengthwise in the middle of each inclosure or valve. The plants of this order are reckoned frigid aphrodisiacs.

8. *Scitamineæ*. This class consists of beautiful exotic plants, all natives of very warm countries. Some of them furnish exquisite fruits; but though the plants rise very high, they are perennial only by their roots. Those which have only one filament, have in all their parts an aromatic odour, and an acrid or poignant taste; qualities, however, possessed in a much greater degree by the roots, which are hot and resinous.

9. *Spathaceæ*, so called because their flowers are protruded from a *spatha* or sheath. They are nearly allied in habit and structure to the liliaceous plants, from which they are chiefly distinguished by the *spatha* out of which their flowers are protruded.

10. *Coronariæ*. These plants are herbaceous, perennial, and from one inch to 15 feet high. The roots are either bulbous, fibrous, or composed of small fleshy knots, which are jointed at top. The bulbs either consist of scales laid over each other like tiles, or are solid. The stem of the liliaceous bulbous plants is properly wanting; what supplies its place being nothing else than the base of the leaves, which, wrapping or enfold-

ing each other, form at bottom a roundish fleshy bulb hitherto distinguished, though perhaps improperly, by the name of *root*. In the others the stem is simple, that is, has few branches, and is either furnished with leaves, or rises naked. The branches are alternate and cylindrical. The leaves are simple, alternate, and entire. Those next the root, termed *radical leaves*, generally form at their origin a sheath, which in a great number is entire; that is, goes all round; whilst in others, it is cleft or divided longitudinally on one side. The flowers are universally hermaphrodite, except in white-liebbore, which has both male and hermaphrodite flowers mixed together on the same root. The flowers are sometimes single, and terminate the stem; sometimes they form an umbel, sometimes a spike, and sometimes a panicle. The calix or flower-cup, in this order, according to Linnæus, is generally wanting. In strict propriety, however, the single cover that is present in most of these plants, though beautifully coloured, ought to be denominated a *calix*; as its divisions, generally six in number, are placed opposite to the stamina. The petals, or, to speak more properly, the coloured leaves of the flower, are in number from one to six. Plants which have a single petal, have the limb or upper part split into six divisions or segments. The petals in some species are rolled or turned back. The nectarium is various; in the lily it is a longitudinal line which runs through each petal, and reaches from the base to the middle. In crown imperial, it is a small hollow or pore, formed at the base of each petal; in aphrodite it consists of six very small valves, which, approaching, form a globe, and are inserted into the base of the petal; in hyacinth, it is composed of three melliferous pores, situated on the top of the seed-bud. In pineapple, it is a small scale lying within the substance of each petal above the base; and in albuca, or bastard star of Bethlehem, it consists of two sharp-pointed bodies proceeding from the furrows of the seed-bud, and covered by the broader base of the three fertile filaments. In some species of lily the nectarium is hairy; in others it is naked. The stamina are six in number; erect, and inserted into the common receptacle, if the flower consists of many petals; into the tube, or divisions of the corolla, if it consists of one. The antheræ are long, commonly divided below, and slightly attached by their sides to the filaments on which they turn like a vane or the needle of a compass. The seed-bud is single, and placed either within the flower-cup, or below it. The style is single, thread-shaped, and generally of the length of the petals. The stigma is generally single, of a conic form, and shaggy or hairy at the extremity. The seed-vessel is generally a capsule, divided externally into three valves, internally into three cells.—With respect to the powers of the plants of this order, it may be affirmed in general, that such as have little taste or smell, as the roots of tulip, and star of Bethlehem, are perfectly innocent; whilst those which have a heavy nauseous smell, as squill, hyacinth, crown imperial, and spider-weed, are at least suspicious, and frequently prove noxious.

11. *Sarmentosæ*, (from *sarmentum*, a long shoot, like that of a vine). This order consists of plants which have climbing stems and branches, that, like the vine, attach themselves to the bodies in their neighbourhood for the purpose of support. Their plants are
far

far from being a true natural assemblage; in fact they scarce agree in a single circumstance, except that expressed in the title, which is far from being peculiar to this order.

12. *Holeracea*. This order consists of plants which are used for the table, and enter into the economy of domestic affairs: it contains trees, shrubs, perennial, and annual herbs. Some of the woody vegetables retain their green leaves during the winter. The roots are very long, and frequently spindle-shaped; from the knots on the stems and branches of such plants as creep on the ground, or float on the water, proceed fibrous and branching roots. The stems and young branches are cylindric; and in the greatest part of the aquatic plants of this order, the stalks are hollow within. The buds are of a conic form, and naked; that is, not accompanied with scales. The leaves are generally simple, entire, alternate, and attached to the branches by a cylindric foot-stalk, which is sometimes very long, but commonly very short. Some plants of this kind have two stipule or scales which are attached to the branches near the origin of the foot-stalk of each leaf. In many others, instead of stipule, each leaf bears on its foot-stalk a membranaceous sheath, which is cylindric, frequently fringed on the margin, and pierced or penetrated by the stem. The flowers are either hermaphrodite; male and female upon the same root; male and female upon different roots; hermaphrodite and male on the same root; or hermaphrodite and female on the same root; or hermaphrodite and male on different roots.

13. *Succulentæ*. This order consists of flat, fleshy, and juicy plants, most of them ever-greens. They are astringent, refreshing, and very wholesome.

14. *Grinales*, from *grus* a crane. These consist of *geranium*, vulgarly called *cranes-bill*, and a few other genera which Linæus considers as allied to it in their habit and external structure. This order furnishes both herbaceous and woody plants. The roots are sometimes fibrous, sometimes tuberous. In some species of wood-forrel they are jointed. The stems are cylindric; the young branches, in some, nearly square. The buds are of a conic form, and covered with scales. The leaves are either simple or compound. The flowers are hermaphrodite; they proceed from the wings of the leaves either singly or in clusters. The calix or flower-cup consists of five distinct leaves, or of one leaf divided almost to the bottom into five parts. It generally accompanies the seed-bud to its maturity. The petals are five in number, spreading, and frequently funnel-shaped. The stamina are generally ten in number, awl-shaped, erect, and of the length of the petals. The stamina are generally oblong; and frequently attached to the filaments by the middle, so as to lie, and sometimes to veer about, upon them. The seed-bud is either oblong, or five-cornered. The number of styles is either one, or five. In *tribulus*, the style is wanting. The seed-vessel is generally a five-cornered capsule, with one, three, five, or ten cells. The seeds are generally equal in number to the internal divisions or the cells of the seed-vessel; one seed being placed in each cell.

15. *Inundatæ*. The plants of this order are aquatic, of low stature, herbaceous, and mostly perennial. The roots are fibrous. The stem is generally wanting.

In its place are an assemblage of leaves, which wrapping or enfolding each other mutually form a sheath; and from the middle of this sheath is produced the foot-stalk of the flower. The leaves are sometimes alternate, sometimes placed in whorls round the stem. In a great many genera the foot-stalk is extended at its origin into a membranaceous substance, which forms a sheath that is cleft through the whole length, on the side opposite to the leaf. The flowers are hermaphrodite, or male and female on the same root. The flower-cup is either wanting, or consists of three, four, or five divisions or leaves, which accompany the seed-bud to its maturity. The petals are generally wanting. The stamina are in number from one to 16 and upwards. The filaments in some genera are so short, that they seem wanting. The antheræ are short, and generally marked with four longitudinal furrows. The seed-buds are in number from one to four, the style is frequently wanting. The seed-vessel is universally wanting, except in *Elatine*, which has a dry capsule, with four external openings, and the same number of cells. The seeds are generally four in number.

16. *Calycifloræ*, (from *calix* the flower-cup, and *flor* the flower), consisting of such plants as have the stamina (the flower inserted into the calix). All the plants of this order are of the shrub and tree kind. Some of them rise to the height of 12 or 14 feet; others not above two or three. The roots are branching, fibrous, and woody. The stems are cylindric. The branches, when young, are cornered; the buds of a conic form, and without scales. The leaves are simple, alternate, and attached to the branches by a very short foot-stalk. The flowers are either male or female upon distinct roots, or hermaphrodite and male on the same root. The calix is a perianthium composed of one leaf divided into two, three, or four segments. It is commonly placed upon the germin or seed-bud, which accompanies it to maturity. The corolla is universally wanting, except in *trophis*, the male plants of which, according to Linæus, have four obtuse and spreading petals. The stamina are generally four in number, slender like a hair, short, placed at a considerable distance from the style, and inserted into the tube of the calix. The pistillum is composed of a roundish germin, crowned with the calix; a single thread-shaped style; and a cylindric stigma. The seed-vessel is either an obtuse oval fruit of the cherry kind, or a globular berry with one cell, containing a roundish seed. The plants of this order are astringent.

17. *Calycantemæ*, (from *calix* the flower-cup, and *antem* the flower); consisting of plants, which, among other characters, have the corolla and stamina inserted in the calix. This order furnishes trees, shrubs, and annual, biennial, and perennial herbs. The herbaceous annuals are by much the most numerous. The roots are branching and fibrous; the stems and branches cylindric, square, or four-cornered while young. The buds are of a conic form, and without scales. The leaves are generally either alternate, simple, and attached to the branches by a short foot-stalk, or opposite at the bottom of the stem; and in some, alternate towards the top. They are universally sessile; that is, attached to the branches, without any footstalk. The calix is universally a perianthium, and generally monophyllous, or composed of one leaf. The corolla consists of four, five, and

and six petals, which are attached to the tube of the calix, and are sometimes placed alternate, sometimes opposite to the divisions of the limb. The stamina, which are in number from 4 to 20 and upwards, are attached to the tube of the calix either on its margin, or lower down. When the number of stamina is double the divisions of the calix, the stamina which stand opposite to these divisions are a little longer than the rest. The antheræ are generally of a hemispherical figure; frequently cleft or slit below; and by that aperture attached slightly to the filaments, on which they often veer about like a vane or needle. They are surrounded longitudinally, and open on the sides into two loculi or cells. The pollen, or male dust, consists of a number of minute particles, of an oval figure, yellow and transparent. The germen or feed-bud is placed either above or under the receptacle of the flower. The style is single, thread-shaped, and of the length of the stamina. The stigma is generally single and undivided. The feed-vessel is a capsule, which is generally divided internally into four loculi or cells. The seeds are numerous, minute, and frequently three-cornered. The plants of this order are reckoned astringent.

18. *Bicornes*, (from *bis* twice, and *cornu* a horn), plants whose antheræ have the appearance of two horns. This appearance, however, is not very conspicuous, unless in a few genera. The plants of this order are all of the shrub and tree kind. The roots are branching and fibrous. The stems and branches are cylindrical. The buds conic, sometimes covered with scales, and sometimes naked. The leaves are generally alternate. In most plants of this order they are either sessile, or supported by a very short foot-stalk, which is semi-cylindric, and flat above. The flowers are universally hermaphrodite, except in one genus, the Indian date-plum, where hermaphrodite and male flowers are produced in the same species upon distinct roots. They proceed either solitary, or in a corymbus from the angles formed by the leaves and branches; or hang down in spikes and clusters at the end of the branches; each flower having a small scale or floral leaf placed under it. In most plants of this order the calix is placed around or below the germen. The calix is universally a perianthium, and generally monophyllous or of one piece, deeply divided into four or five segments, which are permanent, that is, accompany the germen to its maturity. The segments are often acute, and sometimes coloured. The corolla is generally monopetalous, and bell or funnel shaped; the figure, however, is not very constant, even in plants of the same genus. The limb, or upper part of the petal, is generally divided into four or five segments, which are sometimes rolled back, sometimes bent inwards. The limb too is sometimes slightly cut, sometimes divided almost to the bottom. The tube, or lower part of the petal, is cylindrical, and generally of the same length with the calix. The number of stamina is from 4 to 20. These are generally erect, and attached to the lower part of the tube of the corolla. The antheræ are bifid or forked below, and, being slightly attached to the filaments, are frequently inverted in such a manner as to exhibit the appearance of two horns at top. The germen or feed-bud is generally roundish, and seated above the receptacle. The style is single, thread-shaped, of the same length with the corolla, and in a few genera permanent.

The feed-vessel is either a capsule with five cells, a roundish berry, or an oblong four-cornered nut with two cells.—The plants of this order are astringent.

19. *Hesperides*, (from the Hesperides, whose orchards are said to have produced golden apples). The plants of this order are of the shrub and tree kind, and mostly evergreen. The bark of the stalks is slender, and comes off in thin plates. The leaves are generally opposite, and covered with small transparent points. In some, the leaves are placed opposite at the bottom of the stalks, and alternate above. The buds are of a conic form, the flowers generally hermaphrodite; they proceed from the wings of the leaves either singly, or in clusters like ivy-berries. The calix is placed above the feed-bud, and accompanies it to its maturity. The petals are three, four, or five in number, and stand upon the brims of the tube of the calix. The feed-bud is large, oblong, and placed below the receptacle of the flower. The style is single, awl-shaped, of the length of the stamina, and terminated with a single stigma. The feed-vessel in some genera is a berry furnished with one or three cells; a capsule with four cells, or of the nature of a cherry, containing a stone. The seeds are generally numerous, small and oblong. The leaves and fruits are astringent, the berries esculent.

20. *Rotaceæ*, (from *rota*, a wheel), consisting of plants with one wheel-shaped petal without a tube. These resemble in quality those of the order of præcie; to which they are in all respects very nearly allied; but very few of them can be laid in strict propriety to possess the character specified in the title.

21. *Præcie*, (from *precis* early). These consist of primrose, an early flowering plant, and some others which agree with it in habit and structure, though not always in the character or circumference expressed in the title. These plants, which possess no striking uniform characters, are, in general, innocent in their quality; yet the root of sow-bread is dangerous, if taken internally.

22. *Caryophyllææ*. All the plants of this order are herbaceous, and mostly annual. Some of the creeping kinds do not rise above an inch, and the tallest exceed not seven or eight feet. The roots are branching, fibrous, and of a moderate length. The stems are cylindrical. The branches proceed from the wings or angles of the leaves, and are generally opposite, and as it were jointed at each knot. In some species of cerastium the branches are square. The leaves are generally placed opposite in pairs, so as to resemble a cross; and are slightly united at the bottom by their foot-stalks, which form a sort of glove round the stem. The hairs are simple, like silk. The flowers are hermaphrodite; but some have male and female flowers upon distinct roots. They either stand single on their foot-stalks, and proceed from the wings or angles of the leaves and branches, or are disposed in a spike, corymbus, umbel, or panicle. The calix is permanent, and composed either of one piece with five indentments, or of four or five distinct leaves. The corolla generally consists of five petals, which have claws of the length of the calix; and a spreading limb, sometimes entire, but oftener cleft or divided in two. The stamina are in number from 3 to 15, and of a moderate length. When their number is double the divisions of the calix, they are attached alternately to the claws of the petals, those

those so attached being shorter than the rest; the remaining stamina are inserted into the common receptacle, and stand opposite to the segments of the calix. In some genera of this order the number of stamina is found to vary, even in the different flowers of the same plant. The anthers are short, hemispherical, marked with four longitudinal furrows, frequently divided or cleft below, most commonly erect; sometimes, however, *incurvant*, that is, fastened to the filaments by the sides. The point is composed of a single seed-bud, which is generally roundish, sometimes cornered. The styles are thread-shaped, of the length of the stamina, and crowned with a simple stigma, which is sleek or smooth externally, and slightly hollowed or vaulted within. The seed-vessel is a dry capsule, of an oval form, of the length of the calix, and consists of one or three cells. The plants of this order are innocent in their quality; they abound in a watery sort of phlegm, and have bitter feeds. With respect to their virtues, they are reckoned astringent, attenuating, and detergent.

23. *Trihilatae*, (from *tres* three, and *hilum* an external mark on the seed); consisting of plants with three seeds, which are marked distinctly with an external cicatrix or scar, where they were fastened within to the fruit.

24. *Corydales*, (from *κορυς* a helmet); consisting of plants which have irregular flowers, somewhat resembling a helmet or hood. These plants are mostly herbaceous and perennial. The roots are tuberous or knobby. The stems are generally branching. The leaves are alternate, sometimes simple, but most commonly winged. The foot-stalk of the leaves is strait or narrow, except in *epimedium*, where it is large, and has a membranaceous edge or border. The flowers are universally hermaphrodite. They proceed either singly from the wings or angles of the leaves, or are collected in clusters at the end of the branches. The calix consists of two, four, five, or six leaves, which are frequently coloured, and commonly fall off immediately before or very soon after the expansion of the petals. The corolla is generally irregular; of one, or many pieces; gaping; and furnished with a nectarium, which is very different in the different genera. The stamina are in number from two to six, and of a proportionate length, except in honey-flower, which has two shorter than the rest. The filaments are distinct, except in two genera, sumitry and *monnieria*, which have two sets of strings or filaments united in a cylinder. The anthers are universally distinct, except in *impatiens*, where they are formed into a cylinder divided at the base. The seed-bud is generally roundish, but sometimes angular or cornered. The style is commonly single, extremely short, slender, or thread-shaped, and crowned with a simple stigma. The seed-vessel is either a hollow blown-up berry, a capsule of one cell, a longish, or a roundish pod. The seeds are generally numerous and round.

25. *Putamineæ*, (from *putamen* a shell); consisting of a few genera of plants allied in habit, whose fleshy seed-vessel or fruit is frequently covered with a hard woody shell. Most of these plants are acrid and penetrating; and yield, by burning, a great quantity of fixed alkali. With respect to their virtues, they are powerful aperients. The Indians pretend that the fruit of a species of caper-bush, which they call *baducce*,

extinguishes the flames of love.

26. *Multiflueque*, (from *multus* many, and *siliqua* a pod); consisting of plants which have more seed-vessels than one. From the etymology of the term, one would naturally imagine that the seed-vessels in question were of that kind called by Linnæus *siliqua*, or pod: but the fact is, that not a single plant of this order bears pods; the greater part having many dry capsules, and the remainder being furnished properly with no seed-vessel, but bearing numerous distinct seeds. Plants of this order are mostly perennial herbs; the stems of some are erect; others creep upon the ground, and produce roots near the origin of each leaf; lastly, others climb, and attach themselves to the bodies in their neighbourhood, either by the footstalk of the leaves, or by tendrils and clasps which terminate the footstalk. The greatest height of those which rise erect, seldom exceeds eight feet. Those which climb rarely exceed 15 or 20 feet. The roots are generally fleshy. In some they are hand-shaped; in others finger-shaped, or cylindric. In some species of hellebore and ranunculus they are divided into spherical knobs. Lastly, in some plants of this order, the roots are fibrous. The stems and young branches are cylindric. The leaves, which are of different forms, being sometimes simple and entire, sometimes hand-shaped or winged, are generally alternate. The footstalk, which is sometimes cylindric, sometimes angular, is membranous, and very large at its origin, surrounding a great part of the stem from which it proceeds. The flowers are hermaphrodite. They proceed either singly from the wings of the leaves or termination of the branches, or terminate the branches in a spike, panicle, or head. The calix in some is wanting; in others it is generally composed of five pieces, which fall off with the petals. The petals are in number from 4 to 15; generally equal, and sometimes disposed in two or three series; five is the prevailing number. The stamina are in number from 5 to 300, distinct, and attached generally in several rows or series to the receptacle. The seed-buds are generally numerous; the style is frequently wanting. In some the seed-vessel is wanting; in others it is composed of several dry capsules, each containing a single cell. The seeds are numerous, and frequently angular. Most of these plants are acrid, and many of them poisonous. In general, plants that have a great number of stamina are noxious in their quality. When burnt, these plants furnish a fixed alkali; by distillation there is drawn from them a kind of nitrous and aluminous substance. With respect to their virtues, they are caustic and purgative.

27. *Rhæadææ*, consisting of poppy, and a few genera which resemble it in habit and structure. These plants, upon being cut, emit plentifully a juice, which is white in poppy, and yellow in the others. With respect to their virtues, they seem to operate principally upon the nerves. Their juice is soporific and narcotic, their seeds less so, their roots aperient. Applied externally, they are slightly corrosive.

28. *Lurideæ*, consisting of plants whose pale and ominous appearance seems to indicate something baleful and noxious in their nature and quality. Most of these plants are herbaceous and perennial. Many of them are of the masked tribe of flowers; others resemble these in their general appearance, but differ from them

essentially in the equality of their stamina. The roots are generally branched, sometimes tuberous. The stems and branches are cylindric. The leaves are generally simple, and placed alternate. The flowers are hermaphrodite. They proceed either singly or in clusters from the angle formed by the leaves and branches. In some species of lycium, they terminate the branches. The calix is generally of one piece deeply divided into five parts. The corolla consists of one petal, which is either bell, funnel, or wheel shaped. The stamina are four or five in number; and those either of equal lengths, as in the greater, or unequal. The seed-bud is placed above the receptacle of the flower. The style is single; and is terminated by a summit which is hemispherical, and frequently channelled or furrowed. The seed-vessel, in such as have equal stamina, is a berry; in the rest, it is generally a capsule. The seeds are numerous, and frequently kidney-shaped.—These plants in general are poisonous. They have an insipid taste, and a nauseous disagreeable smell.

29. *Campanaceæ* (from *campana* a bell); plants with bell-shaped flowers. The plants of this order are herbaceous and perennial. The roots are either spindle-shaped, or branching and fibrous. The stems are round. The branches are generally alternate. The leaves are simple, alternate, and commonly attached to the branches by a semi-cylindric foot-stalk, which is furrowed above. The indentments are terminated by a small white tubercle or knob, which renders them conspicuous. The flowers are hermaphrodite; and proceed either solitary from the wings of the leaves, or are collected into a spike and head at the end of the flower-stalk. The calix is universally a perianthium situated upon or round the germen, and generally composed of one leaf deeply divided into five segments. The corolla is monopetalous, and of the bell, funnel, or wheel shape. The tube, in flowers of the bell and wheel shape, is very short; in those of the funnel-shape, very long. In Greek valerian, the tube is shut with five valves, which are placed on its apex or top. The limb or upper part of the corolla is deeply divided into five segments, which spread, and are alternate with the divisions of the calix. The corolla is generally permanent. The stamina are five in number, attached to the base of the tube of the corolla, alternate with its divisions, and opposite to those of the calix. The filaments are distinct; very large at their origin; and frequently approach so as to form a sort of vault, which covers the summit of the germen. They are slender and awl-shaped above. The antheræ are very long; oval; marked with four longitudinal furrows, either distinct, or united in a cylinder. The pollen is composed of very small, spherical, white, shining, and transparent particles. The germen is roundish, and situated either wholly or in part under the flower. The style is generally single, and of the length of the stamina or corolla. The stigma is commonly single, but deeply divided. The seed-vessel is a roundish capsule, generally divided into three cells, and furnished externally with the same number of valves. The seeds are small, numerous, attached to a receptacle in the centre of the fruit, generally rounded, and sometimes cornered.—This order furnishes many excellent medicines. The plants abound with a white milky juice, which, upon the stalk being cut, flows out in great quantities.

30. *Compositæ*, (from *com* together, and *torqueo* to twist); consisting of plants which have a single petal that is twisted, or bent towards one side. This order furnishes trees, shrubs, and fat succulent plants, some of which retain their leaves during the winter. The herbaceous vegetables in this order are generally perennial. The roots are sometimes branching, but commonly fleshy, succulent, and garnished with fibres or strings like those of turnip. The stems are round, and in some genera pulpy and succulent. The branches are sometimes placed alternate, and sometimes opposite. The buds are of a conic form, and naked or without scales. The leaves are sometimes alternate, sometimes placed opposite in pairs, and not seldom furrowed the stem in whorls. They are attached to the branches by a cylindrical foot-stalk, which is short, and frequently united to the foot-stalk of the opposite leaf. The defensive and offensive weapons in this order are a downy sort of pubescence, and simple, or forked prickles, which, in some genera, issue from the wings of the leaves. The flowers are hermaphrodite; and stand either singly upon their foot-stalks, or are collected into umbels and clusters. These bunches or collections of flowers sometimes terminate the branches, sometimes proceed from the angles of the branches, and sometimes stand at the side of the wings without issuing from them. The flower-cup is composed of one leaf divided almost to the base in five unequal segments, which embrace each other, and are permanent, or accompany the seed-bud to its maturity. The corolla consists of one petal, which in the different genera is bell, salver, funnel, or wheel shaped. The limb, or upper spreading part of the petal, is generally divided into five equal parts, which are slightly bent or twisted to the left, and embrace or enfold each other like the petals of the mallow tribe. The tube is generally long and cylindrical; sometimes club-shaped, and often wanting. In several flowers of this order the petal is accompanied with that species of superfluity termed a *nectarium*. In the different genera, however, it assumes very different appearances. The stamina are five in number, short, equal, attached at the same height to the tube of the petal, alternate with its divisions, and opposite to those of the calix. The antheræ are generally erect, and frequently approach so as to form a compact body in the middle of the flower. The seed-bud is either single or double. In some the style is wanting. The stigma is frequently double. The seed-vessel in some genera is a pulpy fruit, of the berry and cherry kind; but most frequently that species termed by Linneus *conceptaculum*, and *folliculus*, which has one valve or external inclosure, opens lengthways on one side, and has not the seeds fastened to it. Two of these dry fruits, with a single cell, compose the seed-vessel of most plants of this order. The seeds are generally numerous, and in several genera crowned with a long pappus or downy wing like that of the compound flowers, by means of which they easily disperse and sow themselves.—The plants of this order being cut, emit a juice which is generally milky, and sometimes of a greenish white. From the circumstance of their abounding in this milky juice, the greater part are deemed poisonous; repeated observations having established this aphorism, That milky plants, except those of the plain compound flowers, are generally of a baneful destructive nature, and ought

at least to be administered with caution. With respect to their sensible qualities, they are bitter; particularly the seeds, roots, and bark, in which resides their principal virtue.

31. *Veprecule*, (from *vepres* a briar or bramble), consisting of plants resembling the daphne, dirca, guida, &c. but which, however, do not constitute a true natural assemblage.

32. *Papilionaceæ*, plants that have papilionaceous flowers, i. e. somewhat resembling a butterfly in shape; of which number are all the leguminous plants. The plants of this order are of very different duration; some of them being herbaceous, and those either annual or perennial; others woody vegetables of the shrub and tree kind, a few of which rise to the height of 70 feet and upwards. The herbaceous plants of this order generally climb; for, being weak and as it were helpless of themselves, they are provided by nature with tendrils, and even sharp-pointed hooks, at their extremities, to fasten upon the neighbouring trees or rocks; or the stalks are endowed with a faculty of twisting themselves, for the purpose of support, around the bodies in their neighbourhood. The pea, vetch, and kidney-bean, afford familiar examples of this appearance. The shrubs and trees of this order are mostly armed with strong spines. The roots are very long, and furnished with fibres; but some genera have fleshy knobs or tubercles placed at proper intervals along the fibres. The stems are cylindric, as likewise the young branches, which are placed alternately: those which climb, twist themselves from right to left, in a direction opposite to the apparent motion of the sun. The bark of the large trees is extremely thick and wrinkled, so as to resemble a net with long meshes; the wood is very hard in the middle, and commonly coloured or veined. The buds are hemispherical, without scales, and proceed from the branches horizontally a little above the angle which they form with the leaves. The leaves are alternate, and of different forms, being either simple, finger-shaped, or winged. This last form is very common; the lobes or lesser leaves are entire, and sometimes placed in pairs, but most commonly the winged leaf is terminated by an odd lobe. The winged or pinnated leaves of this order have a daily or periodical motion, depending upon the progress of the sun in his diurnal course. The common footstalk of the winged and compound leaves is marked on the upper surface with a cavity or furrow which runs through its whole length. The flowers are hermaphrodite; and proceed either from the wings of the leaves, or from the extremity of the branches. The calix is a perianthium of one leaf, bell-shaped, bunching out at the bottom, and cut on its brim or margin into five irregular divisions or teeth; the lowermost of which, being the odd one, is longer than the rest: the other four stand in pairs, of which the uppermost is shortest, and stands farthest asunder. The bottom of the calix is moistened with a sweet liquor like honey, so may be deemed the nectarium of these plants. The petals are four or five in number, very irregular, and from their figure and position bear an obvious resemblance to a butterfly expanding its wings for flight. These petals have been characterized by distinct names: the upper one, which is commonly the largest, is termed the *standard*, (*vexillum*); the two side petals, the wings, (*aleæ*); and the lowermost, which is generally united

at top, and divided at bottom, the *keel*, (*carina*). The stamina are generally ten: these are either totally distinct, or united by the filaments into one or two bundles involving the seed-bud. In the latter case, where there are two sets of united filaments, one of the sets is composed of 9 stamina, which are united into a crooked cylinder, that is cleft on one side thro' its whole length: along this cleft lies the tenth filament or stamen, which constitutes the second set, and is often so closely attached to the second bundle, that it cannot be separated without some difficulty. The anthers are small, round, marked with four longitudinal furrows, and slightly attached to the filaments. In lupine, the anthers are alternately round and oblong. The seed-bud is single, placed upon the receptacle of the flower, oblong, cylindrical, slightly compressed, of the length of the cylinder of the united stamina by which it is involved, and sometimes elevated by a slender footstalk which issues from the centre of the calix. The style is single, slender, and generally crooked or bent. The stigma is commonly covered with a beautiful down, and placed immediately under the anthers. The seed-vessel is that sort of pod termed a *legumen*, which is of an oblong figure, more or less compressed, with two valves, and one, two, or more cavities. These cavities are often separated, when ripe, by a sort of joints. The seeds are generally few in number, round, smooth, and fleshy. Jointed pods have generally a single seed in each articulation. The seeds are all fattened along one future, and not alternately to both, as in the other species of pod termed *siliqua*.—The plants of this family are, in general, mucilaginous. From the inner bark of most of them flows, either naturally or by incision, a clammy liquor, which dries and hardens like gum; the juice of others is sweet like sugar; some taste bitter, and are purgative, emetic, or even mortal. A species of eastern alragalus, with goats-rue leaves, is said to be remarkably caustic, and to burn the tongue excessively when chewed. In general, however, these plants are soft and clammy. With respect to their virtues, the plants of this order are highly emollient; some of them are vulnerary and astringent; and the root of anonis, or rest-harrow, is diuretic.

33. *Lomentaceæ*; (from *lomentum*, a colour used by painters). Many of these plants furnish beautiful tinctures, and some of them are much used in dyeing. They very much resemble the last order, differing only in the following particulars. 1. In all plants of this order, except milk-wort, the stamina are distinct. The flower is not shaped like a butterfly, but is less irregular, and frequently consists but of one petal. The leaves are sometimes simple, but most commonly winged. The seeds are generally marked with a circular furrow on both sides. Like those of the leguminous tribe, the plants of this order are generally mucilaginous. From the inner bark of the greater number exudes, either naturally or by incision, a mucilaginous liquor, which sometimes dries upon the plant, and becomes a gummy substance.

34. *Cucurbitaceæ*, (from *cucurbita* a gourd); consisting of plants which resemble the gourd in external figure, habit, virtues, and sensible qualities.—The plants of this order, which generally climb, and have long diffused branches, are mostly herbaceous and perennial. The roots in the perennial plants of this order

der are shaped like those of the turnip; in the annuals, they are branching and fibrous. The stems are cylindrical and fucculent. The young branches have generally five corners. In some species of passion-flower they are square. The leaves are alternate, angular, and sometimes hand-shaped. They are attached to the branches by a foot-stalk, which is pretty long and cylindrical, without any furrow. From the wing or angle of each of the upper leaves proceeds a tendril, which is either simple, or branching, and twists itself spirally round the different bodies in its neighbourhood, for the purpose of supporting and training of the branches. The lower leaves have no tendril. The flowers are either hermaphrodite, or male and female. In this last, the male flowers are generally separated from the female upon the same root; and that either in the same wing or angle of the leaves, or in different angles. The flower-cup, in the female flowers, is placed upon the seed-bud; and generally consists of one bell-shaped leaf, that is deeply divided into five unequal segments, and, unlike the other plants which have the calix seated upon the fruit, falls off with the petals and the other parts of the flower. The corolla consists of one petal, with five equal divisions, which adhere to the tube of the calix, as if glued to it. A species of passion-flower, termed by Linnaeus *passiflora suberosa*, wants the petals. The stamina are in number from one to five, short, and generally inserted into the calix. The filaments are distinct; and the antheræ of many genera are united in a cylinder. In the passion-flower they are slightly attached to the filaments, on which they turn like a vane or the needle of a compass. The feed-bud is single, and placed below the receptacle of the flower. The style is generally single, cylindrical, of the length of the calix, and crowned with a triple stigma. The feed-vessel is generally pulpy, of the apple or berry kind, and consists of one, two, or three cells. The seeds are numerous, generally flat or compressed, and sometimes covered with that kind of proper coat called by Linnaeus *arillus*.—The fruit of these plants is generally purgative and refreshing; that of some of them proves a very violent emetic when used too freely.

35. *Senticoſæ*, (from *ſentis* a briar or bramble); consisting of the rose, bramble, and other plants which resemble them in port and external structure. These plants are so nearly allied in form, habit, and structure, to those of the natural order *Pomaceæ*, that they ought never to have been separated from it. The leaves have a styptic taste; the fruits are acid and cooling. With respect to their virtues, the leaves are vulnerary and astringent, the roots are diuretic. The acid fruits, as strawberry and raspberry, are used with success in putrid and bilious fevers, as likewise in contagious and epidemic dysenteries, which prevail in summer and autumn, and are occasioned by a sudden transition from a hot to a cold air, or by the acid humour which flows into the intestines.

36. *Pomaceæ*, (from *pomum* an apple); consisting of those which have a pulpy esculent fruit, of the apple, berry, or cherry kind. The plants of this order, which furnishes many of our most esteemed fruits, are mostly of the shrub and tree kind. The roots are branched, fibrous, and in the greater part very long. The stems and branches are cylindric. These last are placed alternate; and when young, are, in some genera, angu-

lar. The bark is thick and wrinkled. The buds are of a conic form, placed in the angles of the leaves, and covered with scales which lie over each other like tiles. The leaves, which differ in form, being in some genera simple, in others winged, are, in the greater number, placed alternate. The footstalk of the leaves is furrowed above, and frequently accompanied by a number of knobs like glands. Most of these plants are furnished with two stipule at the origin of the young footstalks of the leaves. These, in some genera, are pretty large; in others, they are so small as scarce to be perceived; and in *coccol-plumb* in particular, they by their minuteness resemble hairs. The flowers are universally hermaphrodite, except in *ſpirea aruncus*, in which male and female flowers are produced on distinct plants. In the greater number of genera they are produced in clusters or heads at the end of the branches. The calix is of one piece, with five segments or divisions, which are permanent, and placed above the feed-bud in some; in the rest, they either fall off with the flower, or wither upon the stalk. The petals are five in number, and are inserted into the tube of the calix. The stamina are generally 20 and upwards, and attached like the petals to the margin of the tube of the calix. The antheræ are short, and slightly attached to the filaments. The feed-bud is single; and in those genera which have the calix permanent, it is placed below the receptacle of the flower. The feed-vessel is a pulpy fruit of the apple, berry, or cherry kind. Those of the apple kind are divided internally into a number of cavities or cells. The seeds are numerous.—The pulpy fruits of this order are acid, esculent, and of great efficacy in putrid and bilious fevers.

37. *Columniferae*, (from *columna* a pillar, and *fero* to bear); consisting of plants whose stamina and pistil have the appearance of a column or pillar in the centre of the flower. This order furnishes a choice collection of herbs both annual and perennial, shrubs, and trees. These are very different in size and height, from the creeping mallows, and low shrubby tea-tree, to the fleshy limes, and the more lofty silk-cotton trees, which by some modern writers are affirmed to be so large as not to be fathomed by 16 men, and so tall that an arrow cannot reach their top. The shrubs and trees of this order are deciduous, pretty thick, of a beautiful appearance, with an erect stem, which is formed by its branches and foliage into a round head. The roots are extremely long, branch but little, and either run perpendicularly downwards, or extend themselves horizontally below the surface. The stems are cylindric. The young branches, though commonly of the same figure, are sometimes angular. The bark is thick and pliant. The wood, in general, very soft and light. The buds are of a conic form, naked, or without scales; and situated either at the extremity of the branches, or in the angle formed by the branch and leaf. The leaves are alternate, simple, divided into several lobes, and frequently hand or finger shaped. The ribs or nerves on the back of the leaf, in some genera of this order, are provided near their origin with a number of hollow furrows or glands, which, being filled with a clammy honey-like liquor, have been considered as so many vessels of secretion. The footstalk of the leaves is cylindric, swelled at its origin, and appears jointed at its junction with the branch. The flowers are universally hermaphrodite,

phrodite, except in *biggleria*, and a species of Virginian marshmallow, called by Linnæus *napea dioica*; the former of which bears male and female, the latter male and hermaphrodite, flowers on different roots. In many plants of this order, the flowers generally open about nine in the morning, and remain expanded till one in the afternoon. The flowers either terminate the branches, proceed from the angles of the leaves, or are disposed either singly or in a corymbus along the branches or stem. In most of these genera the calix is single, but in others frequently double. In these last the inner calix is always of one piece, generally divided into five segments; the outer consists either of one leaf, of three distinct leaves, or of many. The calix, when single, is sometimes composed of one leaf which is permanent, or of several distinct leaves which are generally coloured, and fall off with the petals. In plants that have a double calix, both flower-cups are generally permanent. The petals in this order are from four to nine; five is the prevailing number. The stamina, which are in number from 5 to 20 and upwards, are generally inserted into the common receptacle of the calix, or into the pitillum or feed-bud. The filaments are either distinct, or united in a cylinder, which, proceeding from the receptacle of the calix, furrounds the feed-bud, and attaches itself to the base of the petals, with which it slightly unites. The antheræ are frequently roundish, and placed erect on the filament; most commonly, however, they are oblong or kidney-shaped, and slightly attached by the middle, or sides, to the filaments, on which they turn like a vane or needle. This last is particularly the characteristic of all the mallow tribe. The feed-bud is generally roundish or conic; and sometimes, as in the tea-tree, angular. The feed-vessel is generally a capsule; sometimes a pulpy fruit of the berry or cherry kind. In some, it is a woody or membranous capsule, divided into as many cells internally as there were partitions in the feed-bud. The seeds are generally solitary, sometimes angular, and sometimes kidney-shaped.—These plants are mucilaginous and lubricating.

38. *Trilocææ*, (from *tricus* three, and *ovum* a grain); consisting of plants with a single three-cornered capsule, having three cells or internal divisions, each containing a single seed. The single seed-vessel of these plants is of a singular form, and resembles three capsules, which adhere to one common footstalk as a centre, but are divided externally into three pretty deep partitions. This family is not completely natural. It must be observed, however, that the character expressed in the title is a striking one; and that tho' the plants which possess it are not connected by such numerous relations as to form a true natural assemblage, yet they are by that circumstance distinguished from all other plants with as great, nay greater facility, than by any artificial character yet known. But all the genera of this order have not the striking character just mentioned.

39. *Siliquosæ*, (from *siliqua* a pod), consisting of plants which have a pod for their feed-vessel. This order chiefly furnishes biennial and perennial herbs of an irregular figure. The roots are long, branched, crooked, and fibrous. In some they are succulent and fleshy, in others jointed. The stems and young branches are cylindric. The leaves, which differ in point of form, being sometimes simple, sometimes winged, are generally

placed alternate. The flowers are hermaphrodite, and in the greater number disposed in a spike at the extremity of the branches. The flower-cup is composed of four leaves, which are oblong, hollow, blunt, bunched at the base, and fall with the flower. These leaves are sometimes erect, and sometimes spread horizontally. The petals, which are four in number, spread at top, and are disposed like a cross: the claws or lower part of the petals are erect, flat, awl-shaped, and somewhat longer than the calix. The upper part widens outwards. The stamina are six in number; two of which are of the length of the calix, and the remaining four somewhat longer, but shorter than the petals. The antheræ are of an oblong figure, pointed, thicker at the base, and erect. Betwixt the stamina, in plants of this order, are generally lodged one, two, or four, round greenish knots, which in some genera are so small as to elude the sight. These glands, called by Linnæus *glandule nectariferæ*, and used very improperly by that author as an essential character in discriminating the genera, seem to be prominences of the receptacle of the flower, occasioned by the stamina being deeply lodged in its substance. The seed-bud is single, and stands upon the receptacle of the flower. The style, which is either cylindric or flat like a scale, is of the length of the four longer stamina in some genera; in others it is very short, or even wanting. It accompanies the feed-bud to its maturity. The stigma is blunt, and sometimes deeply divided into two parts. The feed-vessel is either a long pod, or a short and round one. Either sort has two valves or external openings, and in a great many genera the same number of internal cavities or cells, the partition of which projects at the top beyond the valves. The seeds are roundish, small, and attached alternately by a slender thread to both sutures or joinings of the valves. These plants have a watery, sharp, lixivial taste; and are charged with a fixed alkaline salt, which is drawn from them by burning, and being distilled without any addition produces a volatile alkali. Most of them have a stinking smell. With respect to their virtues, they are diuretic, attenuating, detensive, and antiscorbutic. These qualities, however, are most eminently possessed by the live plants; when dried, they either entirely disappear, or are greatly diminished. Applied externally, these plants are useful in diseases of the skin, as the itch, leprosy, &c.

40. *Perfonatæ*, (from *persona*, a masque); consisting of a number of plants whose flowers are furnished with an irregular, gaping, or grinning petal, in figure somewhat resembling the snout of an animal. This order furnishes both herbaceous and woody vegetables of the shrub and tree kind. The roots are generally fibrous and branched. The stems and branches are cylindric when young, except in some species of figwort, in which they are square. The leaves are simple, generally placed opposite in pairs at the bottom of the branches, but in many genera stand alternate towards the top. The flowers are universally hermaphrodite; they proceed either singly or in clusters from the wings of the leaves, or terminate the branches in a spike, panicle, or head. The calix is of one leaf, which is cut into two, three, four, or five segments, or divisions, that are permanent. The corolla is composed of one irregular petal, with two lips resembling, as was already observed, the head
or

or snout of an animal. In some plants the stamina are two or four in number, and of an equal length; in others they are universally four in number, two of which are long, and two short. The seed-bud is single, and placed above the receptacle of the flower. The style is single; thread-shaped; bent in the direction of the stamina; and crowned with a stigma, which is generally blunt, and sometimes divided in two. The seed-vessel is a capsule, generally divided internally into two cavities or cells, and externally into the same number of valves or inclosures. The seeds are numerous, and affixed to a receptacle in the middle of the capsule.—These plants possess nearly the same qualities with the lip-flowers, though in a less degree. With respect to their virtues, many of them are aperient, anodyne, purgative, and even emetic. The internal use of many of them is extremely pernicious; applied externally, they are anodyne, and powerful resolvents.

41. *Asperifoliae*, rough-leaved plants. The greatest part of these are herbaceous and perennial. The roots are branching and fibrous; the stems and branches rounded; the buds of a conic form, naked or without scales. The leaves are simple, alternate, commonly very rough to the touch, and in most of the herbaceous plants sessile or attached to the stem and branches without any foot-stalk. In the few trees, however, of this order, the leaves have a foot-stalk, the lower part of which, after the fall of the leaves, remains like a spine or thorn. The hairs are simple, and generally very rough to the touch. The flowers are in some genera solitary; but commonly collected into a spike or corymbus. They do not proceed from the angle formed by the stem or branch with the leaf, as in many plants; but from the side of the leaf, or from that part of the stem which is opposite to the leaf. They are almost universally hermaphrodite: in a few species of *cordia*, male and female flowers are produced upon different roots. The calix is composed of one leaf, which is divided from three to ten equal or unequal parts. Those with four naked seeds have the calix deeply divided into five parts which are permanent. The corolla is monopetalous, or composed of one petal, which in different plants is bell, funnel, salver, and wheel shaped. The divisions of the limb or upper part of the petal are generally five, alternate with those of the calix; equal and regular, except in *echium*. The stamina are five in number, alternate with the divisions of the corolla. They are equal, attached to the tube of the corolla a little above its origin, and of the same height. The antheræ are in some genera connivent; that is, approach, and form a compact body above the filaments. The pistillum is generally composed of a slender style of the same length with the stamina, and crowned with a simple stigma. It proceeds from a germen or seed-bud, which in some plants is undivided, but generally split into four. The seeds are generally four in number, and lodged in the bottom of the calix.—Most of the rough-leaved plants are used in medicine: the flowers are esteemed cordial, the leaves and roots vulnerary and altringent; and the hard bony seeds are reckoned powerful promoters of urine. Externally, these plants are used for burnings and poisonous bites; they extirpate warts, and relieve disorders of the loins.

42. *Verticillatæ*, consisting of herbaceous vegetables,

having four naked seeds, and the flowers placed in whorls round the stalk. The roots are branched and fibrous. The stems are round when old, but square when young; as are likewise the young branches, which stand opposite. The leaves are opposite, and in the greater number covered with transparent points. Those which are placed next the flower, generally differ from the stem-leaves. In the greater number of plants of this kind, the leaves are supported upon a long cylindrical foot-stalk that is furrowed above. The flowers are universally hermaphrodite, except in a species of thyme mentioned by Mr Adanson, which appears to have male or barren flowers on one root, and female or fertile flowers on the other. They are disposed round the stem in whorls or small heads with short foot-stalks. The calix is of one piece, that is generally cut into five unequal divisions, whose disposition sometimes represents two lips; the uppermost of which has commonly a less number of divisions: it accompanies the seeds, which it nourishes in its bosom, to their maturity. The petal is of the gaping or lip kind, and in the different genera is more or less irregular or unequal, either in its tube, or in the divisions of the lips; the number of which varies from two to five. These divisions frequently form two lips; of which the uppermost, termed the *crest* and the *helmet*, is sometimes entire, sometimes more or less deeply cut into two; the lowermost, termed the *beard*, generally into three. The stamina are two or four in number. In the greater part there are four stamina of unequal length, two of them being long, and two short. These four unequal stamina are frequently dissimilar, and approach by pairs; they are inclined towards the back of the petal, and parallel; the two innermost being shortest, and attached somewhat lower than the two others to the tube of the flower. The seed-bud, which consists of four distinct ovaries, is placed upon the seat of the flower, and elevates from their centre a common style, which is slender, bent in the same manner as the filaments, which it somewhat exceeds in length, and terminated by a double stigma or summit, the divisions of which are unequal, and turned backwards. The seed-vessel in this order is wanting. The seeds are four in number, and lodged in the bottom of the calix as in a matrix or seed-vessel. Each seed has two covers; the one external, of a cartilaginous or leathery substance; the other internal, membranaceous, of a very fine texture, and placed immediately above the radicle or embryo plant.—The plants of this order are fragrant, warm, penetrating, and accounted cordial and cephalic. Their chief virtue resides in the leaves.

43. *Dumoseæ*, (from *dumus* a bush); consisting of a number of shrubby plants, which are thick set with irregular branches, and bushy. The plants of this order are all of the shrub and tree kind, thick and bushy, rising from 6 to 25, 30, and even 40 feet high. Many of them too, as bastard jalaternus, holly, iron-wood, New-Jersey-tea, star-apple, viburnum, winter-berry, and some others, retain their beautiful leaves during the whole year. The roots are branched and fibrous. The stems are cylindric; the young branches sometimes angular. The buds are naked, that is, without scales, in the evergreen shrubs of this order; covered with scales in most of the others. The leaves, which in some genera are simple, in others compound, are placed alternate

ternate in some, and opposite in others. The flowers are mostly hermaphrodite. They proceed from the wings of the leaves either singly or in clusters; or they terminate the stem in that sort of flowering head called a *corymbus*. The calix is generally very small, placed below or around the seed-bud; and consists of one leaf, with four, five, or six divisions, which are permanent. The rhamnus has no calix. The petals are in number from one to five. The stamina are either four, five, six, or ten. The seed-bud is generally roundish, and placed within the flower. The style is commonly single, and sometimes wanting. The stigma is either single or triple. The seed-vessel is generally a berry, sometimes a dry capsule; the seeds are generally single and egg-shaped. The berries, bark, and flowers of many of these plants are purgative, and act particularly on the lymph and bile.

44. *Sepiaria*, (from *sepēs* a hedge), consisting of a beautiful collection of woody plants, some of which from their size, elegance, and other circumstances, are very proper furniture for hedges. This order furnishes woody plants both of the shrub and tree kind, most of which do not drop their leaves till nearly the time when the new leaves begin to appear.

45. *Umbellatæ*, (from *umbella* an umbel); consisting of plants whose flowers grow in umbels, with five petals that are often unequal, and two naked seeds that are joined at top and separated below. These plants are herbaceous, and chiefly perennial. The roots are either tuberous or spindle-shaped, and sometimes forked. The stems are cylindric, full of pitch, and frequently hollow. The branches are alternate. The leaves, which like the branches are put on alternately, are very different in point of form; being simple and entire in some; target-shaped, in a species of navel-wort; finger or hand shaped, in some others; and winged or pinnated with numerous minute divisions, as in the greater number. They are supported by a foot-stalk, which is very broad and membranous at its origin, and commonly embraces the whole contour of the stem and branches. The flowers are in general hermaphrodite. There are, however, some that have male or barren flowers in the same umbel. This is particularly the case with those umbelliferous plants which have the petals in the flowers of the circumference large and unequal. In these plants the flowers in the circumference only prove fertile; those in the centre, or disc, proving abortive. *Oenanthe* and *imperatoria*, on the contrary, have the flowers in the circumference abortive. In ginseng, hermaphrodite and male flowers are produced upon distinct plants. The flowers are disposed in an umbel, which is either simple or compound. The common calix in this order is that sort termed very improperly by Linnæus *involucrum*, or the flower-cover; which in the greater number consists of one or more leaves placed under the partial or universal umbel, or both, for the purpose of support. The presence or absence of one or both of these covers affords excellent marks in discriminating the genera of this very similar order of plants. The proper calix of each flower, in the aggregate, consists of five minute indentments placed upon the seed-bud, which it envelops, and accompanies to its maturity. The petals are five in number, and disposed upon the sides of the flower-cup in form of a rose. In the florets of the

centre, the petals are generally pretty equal and small; in those of the circumference, they are frequently unequal and larger; in the greater number, they are heart-shaped, and cut almost to the middle in two. The stamina are five in number, placed opposite to the divisions of the flower-cup, and alternate with the petals. The seed-bud is universally placed under the seat of the flower, and supports two styles which are turned backwards, and crowned with simple funnits which do not differ in appearance from the styles. The seed-vessel in this order is wanting. The seeds are two in number, which, when ripe, separate below, but remain closely attached at top. The plants of this order, which grow in dry places, are sudorific, stomachic, and warming. Their virtue resides chiefly in the seeds and leaves. Those which grow in marshy places are generally poisonous; but, notwithstanding the extremely warm and even caustic quality of most of these plants, many of them are employed in the kitchen, and in the œconomy of domestic affairs.

46. *Hederaceæ*, (from *hedera* ivy), consisting of ivy and a few other genera that seem nearly allied to it. This order furnishes both herbaceous and shrubby plants; most of which, particularly ivy and vine, have creeping branches, which attach themselves by roots or tendrils to the bodies in their neighbourhood. The roots are long, with few branches. The stems and young branches are cylindric. In some species of vine they are square. The leaves are alternate; sometimes simple, sometimes winged, in which the surface of the leaves is covered with points. The foot-stalk of the leaves is cylindric, and without any furrow. The buds are of a conic form, and without any scales. The flowers are either hermaphrodite, male and female upon different roots, or hermaphrodite and male upon different roots. In some, they terminate the branches in an umbel; in others, they proceed in clusters from the side opposite to the leaves; and in some, they are produced along the branches. The calix consists of one leaf divided into five parts, which are small and generally permanent. The petals in this order are generally five. The stamina are in number five; awl-shaped, erect, and generally of the length of the petals. Cissus has only four stamina, which are inserted into the nectarium, a sort of border surrounding the seed-bud. The antheræ are roundish, and sometimes, as in ivy, attached to the filaments by the sides. The seed-bud is sometimes round, sometimes shaped like a top or pear, and ends in one, two, or five awl-shaped styles, which are crowned with a simple stigma. The flowers of the vine have no style. The seed-vessel is of the berry kind, with one, two, or five styles. The seeds are from one to five in number; placed either in distinct cells, or dispersed through the pulp without any partition.

47. *Stellatæ*, (from *stella* a star); consisting of plants with two naked seeds, and leaves disposed round the stem in form of a radiant star. This order contains herbs, shrubs, and trees. The herbs, which are most numerous, are chiefly annual, and creep along the surface of the ground. The shrubs and trees are mostly evergreens, which rise erect, and are of an agreeable conic form.—These plants are opening; some of their seeds, particularly those of coffee, are bitter and cordial; some of them are used in dyeing, and others in medicine.

48. *Aggregate*, (from *aggregare*, to assemble or collect); comprehending those plants which have aggregate flowers, consisting of a number of florets or small flowers, each of which have a proper and common calix.

49. *Compositæ*, consisting of plants with compound flowers. In this order Linnæus has constructed his first or primary divisions from the different sexes of the florets, which he terms *polygamy*; the subaltern divisions are constructed from the figure of the petals, the disposition of the flowers, the pappus or crown of the seed, the common receptacle, and other circumstances which characterize the subaltern divisions in other authors.

50. *Amentaceæ*, (from *amentum* a catkin), plants bearing catkins; as *salix*, *populus*, *platanus*, &c.

51. *Coniferae*, (from *conus* a cone, and *fero* to bear); consisting of plants, whose female flowers, placed at a distance from the male, either on the same or distinct roots, are formed into a cone. In this character, the only one expressed in the title, the plants in question seem to be nearly allied to the family of mosses; from which, however, they are easily distinguished by their habit, as well as by the structure of the small flowers, in which the stamina are united below into a cylinder, and distinct at top. The plants of this order are mostly of the shrub and tree kind, and retain their leaves all the year. The form of these plants is generally conic, and extremely beautiful, from the disposition of the branches, which cover the stems even to the roots, extending themselves horizontally and circularly like so many rays. The height of some genera of this order does not exceed half a foot, that of others approaches to a hundred. The roots are short, branching, not very fibrous, and extend horizontally. The stems and branches are cylindric. The bark is thin, and split into slender scales. The wood, except that of the yew-tree, possesses little hardness. The buds are of a conic form, and naked, or without scales. The leaves are entire, small, and thick, frequently triangular, and generally pointed. Juniper has a prickly and thorny leaf. With respect to situation, they admit of great variety, being either alternate, opposite, placed in whorls round the stem, or collected into small bundles which proceed from a single point. They are placed on the branches without any sensible footstalk. The flowers in this order are universally male and female. In some genera, the male flowers are collected into a spike or cone at the end of the branches; in others, they proceed singly from the wings of the leaves, or termination of the branches. The female flowers are generally collected into a cone; but in yew-tree and shrubby horse-tail they are single, and terminate the branches. The calix of the male flowers is a catkin; of the female, a cone. The petals of this order are wanting; except in the female flowers of juniper, which have three sharp, rigid, and permanent petals. The stamina are in number from 3 to 20 and upwards; united by their filaments into a cylinder or pillar, which rises out of the centre of the calix. The antheræ are erect, distinct, of a roundish form, and divided into internal partitions or cells, which, in the different genera, are in number from two to ten. The seed-buds are generally numerous, and placed betwixt the scales of the cone, which serve for a calix. From each seed-bud arises a very short cylindrical style, crowned with a simple stigma,

of a conic form. These plants have probably no seed-vessel or fruit; the seeds being naked, and involved only by the scales of the calix. In some genera, these scales are of a bony nature, and almost united; in others, they are of a substance like leather; in juniper, they are united, and become fleshy and succulent like a berry. The seeds in this order, being nourished, as in a seed-vessel, by the scales of the cone, or common calix, differ in nothing from the germina or seed-buds.—Most of the cone-bearing plants are resinous, or gummy; and the gums proceeding from them have a bitter taste, but generally a very agreeable smell.

52. *Coadunatæ*, (from *coadunare*, to join or gather together); so termed from the general appearance of the seed-vessels, which are numerous, and, being slightly attached below, form all together a single fruit in the shape of a sphere or cone; the parts of which, however, are easily separated from one another. This order, which consists of exotic plants, furnishes a beautiful and choice collection of shrubs and trees, both evergreen and deciduous. The trees are often 60 feet high, and garnished from the bottom to the top with spreading branches and leaves of a bright green colour, which assume a very agreeable conic form. The roots are branching and fibrous. The stems are cylindric, and the wood very hard. The buds are conic, flat, and generally without scales. The leaves are universally simple and alternate. The footstalk is cylindric, without furrows, frequently swelled at its origin, and appears jointed at its insertion into the branch. The flowers are hermaphrodite, and are generally produced either along or at the end of the branches. The calix generally consists of three oblong plain leaves, like petals, which fall off with the flower. The petals are in number from 6 to 18, oblong, concave, and frequently disposed in two or three series or rows, the outermost of which are largest. The stamina are numerous, short, and inserted into the common receptacle in some, and into the seed-bud in others. The filaments are very short and slender, some genera having scarce any at all. The antheræ are numerous, slender, and placed round the seed-bud. The pistillum generally consists of a number of seed-buds disposed in the form of a cone, and seated upon a receptacle which rises like a small pillar above the receptacle of the calix. From each seed-bud generally arises a cylindric style, which is very short. The stigma is commonly blunt. The seed-vessel is commonly a berry; but in magnolia it is an oval cone, consisting of a number of roundish capsules laid over each other like tiles. The fruits, or seed-vessels, whether of the berry, capsule, or cherry kind, are equal in number to the seed-buds, and generally slightly attached below. The seeds are numerous, hard, roundish, and sometimes cornered. The plants of this order have a strong, agreeable, and aromatic smell; the fruits and seeds have a pungent taste like pepper; the bark and wood are bitter.

53. *Scabridæ*, (from *scaber* rough, rugged, or bristly), consisting of plants with rough leaves. There seems to be some impropriety in characterizing these plants by a name expressive of the roughness of their leaves, as that circumstance had previously furnished the classic character of the *Asterifoliæ*. The degree of roughness, however, is much greater in the plants which make the subject of the present article.—The plants of this order are in general of an astringent nature; their taste

is bitter and styptic.

54. *Miscellanea*, miscellaneous plants. This order consists of such genera as are not connected together by very numerous relations. They are, datifca, potium, refeda, sanguiforba, lemma, piftia, coriaria, empetrum, achyranthcs, amaranthus, celofia, gomphrena, irefine, phytolacca, nymphæa, farraccnia, cedrela, fwientia, corrigiola, limeum, telephium.

55. *Filices*, ferns; confifting of plants which bear their flower and fruit on the back of the leaf or ftalk. Thefe plants, in figure, approach the more perfect vegetables; being furnifhed, like them, with roots and leaves. The roots creep, and extend themfelves horizontally under the earth, throwing out a number of very flender fibres on all fides. The ftcm is not to be diftinguifhed from the common footftalk, or rather middle rib of the leaves: fo that in ftrict propriety the greater number of ferns may be faid to be *acaules*; that is, to want the ftcm altogether. In fome of them, however, the middle rib, or a ftalk proceeding from the root, overtops the leaves, and forms a ftcm upon which the flowers are fupported. The leaves proceed either fingly, or in greater numbers from the extremities of the branches of the main root. They are winged or hand-shaped in all the genera, except in adders-tongue, pepper-grafs, and fome fpecies of fpleen-wort. The flowers, whatever be their nature, are, in the greater number of genera, fattened, and as it were glued, to the back of the leaves; in others, they are fupported upon a ftcm which rifcs above the leaves; but in fome, are fupported on a flower-ftalk, as already mentioned. The ftamina are placed apart from the feed-bud in a genus termed by Mr Adanfon *palmæ filix*: in the other ferns, where we have been able to difcover the ftamina, they are found within the fame covers with the feed-bud. Moft of the ferns have a heavy difagreeable fmell: as to their virtues, they are opening and attenuating.

56. *Mufci*, moffes. Thefe plants refemble the pines, firs, and other evergreens of that clafs, in the form and difpofition of their leaves, and manner of growth of the female flowers, which are generally formed into a cone. They frequently creep, and extend themfelves like a carpet upon the ground, trees, and ftones, being generally collected into bunches and tufts; the fmalleft are only one third of an inch in height, and the largeft do not exceed five or fix. Few of the moffes are annual; fmall as they are, the greater number are perennial and evergreens. Their growth is remarkably flow, as may be judged by the time that the antheræ take to ripen. This, reckoning from the firft appearance of the antheræ, to the difperfon of its powder or male duft, is generally four or fix months. Although preferved dry for feveral years, thefe plants have the fingular property of refuming their original verdure, upon being moistened. It would be worth while to determine whether they do not alfo refume their vegetative quality. The roots of plants of this order are fibrous, flender, branched, and fhort. The ftcms are cylindric and weak, as are alfo the branches; they creep upon the ground, and ftrike root on every fide. The leaves are very fmall and undivided. They differ with refpect to fituation; being either alternate, oppofite, or placed by fours round the ftalk. They have no perceptible footftalk nor middle

rib, and are feated immediately upon the ftcm. The flowers are univerfally male and female: in fome, the male flowers are produced upon the fame plants with the female, and ftand before them; in others, they are produced fometimes on the fame, and fometimes on diftinct plants. The male flowers confift entirely of antheræ, and their covering; proceed either fingly, or in clufters, from the extremity of the branches, or angles of the leaves; and are either feated immediately upon the branches, or fupported by a long footftalk. The female flowers, which generally refemble capfules or cones, are all placed immediately upon the ftcm or branches, without any footftalk; and proceed fingly, either from the wings of the leaves, or fummit of the branches; when produced upon the fame plant with the male, they are always placed under them. The female cones of the moffes greatly refemble thofe of the pines, and evergreen trees of that clafs; the fcales which form them are true leaves, each containing in its wing or angle a fingle feed. When the feeds are ripe, the cones probably open for their difperfon. When fhut, they refemble buds, and have fometimes been ignorantly miftaken for fuch. The calix, in this order, if it can be called fuch, is that appearance refembling a veil or monk's cawl, which in the male flowers covers or is fufpended over the tops of the ftamina like an extinguifher, and is termed by Linnæus *calyptra*. The petals are univerfally wanting. The moffes in general are almoft taftelefs, have few juices, and being once dried do not readily imbibc moifture from the air. Thofe which grow in water, being thrown into the fire, grow red, and are reduced to afhes without receiving or communicating any flame; on which account fome fuperftitious people, the Siberians in particular, place water mofs in their chimnies as a prefervative againft fire. Moft of the moffes are purgative; fome violently fo, and even emetic. They are all of wonderful efficacy in preferving dry fuch bodies as are fufceptible of moifture; and in retaining, for a long time, the humidity of young plants without expofing them to putrefaction. For this reafon, fuch plants as are to be fent to any confiderable diftance, are generally wrapped up in them.

57. *Alge*, fags; confifting of plants whole root, leaf, and ftcm, are all one. Under this defcription are comprehended all the fea-weeds, and fome other aquatic plants.

58. *Fungi*, mufhrooms. Thefe plants are rarely branched, fometimes creeping, but moft commonly erect. Such as are furnifhed with branches have them of a light fpongy fubftance like cork. Mufhrooms differ from the fuci, in that thofe which, like the fuci, have their feeds contained in capfules, are not branched, as that numerous clafs of fea-weeds are. The greateft part of mufhrooms have no root; fome, inftead of roots, have a number of fibres, which, by their inoculations, frequently form a net with unequal melfes, fome of which produce plants fimilar to their parent vegetable. The ftamina in thefe plants are ftill undetermined. The feeds are fpread over the furface of the plant, or placed in open holes or cavities, refembling the open capfules of fome of the fuci. In mufhrooms which are branched, the feeds are frequently vifible by the naked eye, and always to be diftinctly obferved by

the assistance of a good microscope. These plants are very astringent, and some of them are used for stopping violent hæmorrhages. As a vegetable food, they are at best suspicious: some of them are rank poison.

59. *Dubii ordinis*. Under this name Linnæus classes

all the other genera which cannot be reduced to any of the abovementioned orders, and which are near 120 in number.—In the following Table, the number placed at the end of each generic description points out the natural order to which the genus belongs.

TABLE

Botargo
Bottle.

BOTARGO, a kind of sausage, made with the eggs and blood of the mullet, a large fish common in the Mediterranean. The best kind comes from Tunis in Barbary: It must be choiced dry and reddish. The people of Provence use a great deal of it, the common way of eating it being with olive oil and lemon juice. There is also a great consumption of it throughout the Levant.

BOTE, (Sax.), signifies a recompence, satisfaction, or amends: hence comes *manbote*, compensation or amends for a man slain, &c. In king Ina's laws is declared what rate was ordained for expiation of this offence, according to the quality of the person slain. From hence likewise we have our common phrase, *to-bote*, i. e. *compensationis gratia*. There are *boufe-bote*, *plough-bote*, &c. privileges to tenants in cutting of wood, &c.

BOTELESS, (*sine remedio*). In the charter of Hen. I. to Tho. archbishop of York, it is said, "that no judgment, or sum of money, shall acquit him that commits sacrilege; but he is in English called *boteless*, viz. without emendation." We retain the word still in common speech: as, It is *boteless* to attempt such a thing; that is, It is in vain to attempt it.

BOTH (John and Andrew), Flemish painters, and pupils of Bloemart. The union of these brothers was very singular; they were inseparable in their studies, travels, and paintings. John painted the landscape part of their pictures in the manner of Lorrain, and Andrew the figures and animals in the style of Bambiocche. They both died in 1650. John's taste in landscape is elegant; his ideas are grand; his composition beautiful; and his execution rich and masterly in the highest degree. His light is not always well distributed; but his figures are excellent. It is to be regretted that we have not more of his works; for they are certainly, upon the whole, among the best landscapes we have.

BOTHNIA, a province of Sweden, at the end of the gulph of the same name. It is divided into two parts called *east* and *west Bothnia*, the former of which belongs to Finland. West Bothnia is full of mountains; the earth is sandy, and yet a scarcity of provisions is seldom known. Cattle and game are so common, salmon and a fort of herrings so plenty, and the trade of skins is so gainful, that the inhabitants can command what they want from their neighbours. There are only two towns worth mentioning, viz. Tornea and Uma. The inhabitants of this province are Protestants; and are a civil well-behaved people.

BOTT, among bone-lace weavers, a kind of round cushion of light matter placed on the knees, whereon they work or weave their lace with bobbins, &c.

BOTT, in zoology. See **BOTTS**.

BOTTLE, a vessel proper to contain liquors, made of leather, glass, or stone. There are bottles of boiled leather which are made and sold by the case-makers. Those amongst the ancient Hebrews were generally made of goat-skin, with the hair on the inside, well pitched and sewed together; the mouth of the bottle was through the animal's paw that furnished the matter of it.

There are now in use bottles of fine glass, which are commonly covered with oil; and others of thick glass, which are not covered. Formerly all these bottles made in France held exactly a pint Paris measure, (about a

quart of English wine measure); but since the tavern-keepers fell short of their wine in such bottles, notwithstanding an ordinance to the contrary, so that one would think the glass-makers had entered into an agreement with them not to make any bottles that hold the full measure, there are none but hold less, and some considerably so.

Dr Percival cautions against the practice of cleaning of wine-bottles with leaden shot. It frequently happens (he thinks), through inattention, that some of the little pellets are left behind; and when wine or beer is again poured into the bottles, this mineral poison will slowly dissolve, and impregnate those vinous liquors with its deleterious qualities. The sweetness which is sometimes perceived in red port wine, may arise from this cause, when such an adulteration is neither designed nor suspected.

BOTTOM, in a general sense, denotes the lowest part of a thing, in contradistinction to the top or uppermost part.

BOTTOM, in navigation, is used to denote as well the channel of rivers and harbours, as the body or hull of a ship. Thus, in the former sense, we say, a *gravely bottom*, *clayey bottom*, *sandy bottom*, &c. and in the latter sense, a *British bottom*, a *Dutch bottom*, &c.—By statute, certain commodities imported in foreign bottoms pay a duty called *petty customs*, over and above what they are liable to if imported in British bottoms.

BOTTOMRY, in commerce, (a practice which originally arose from permitting the master of a ship in a foreign country to hypothecate the ship in order to raise money to refit), is in the nature of a mortgage of a ship; when the owner takes up money to enable him to carry on his voyage, and pledges the keel or bottom of the ship (*pars pro toto*) as a security for the repayment. In which case it is understood, that if the ship be lost, the lender loses also his whole money; but if it return in safety, then he shall receive back his principal, and also the premium or interest agreed upon, however it may exceed the legal rate of interest. And this is allowed to be a valid contract in all trading nations, for the benefit of commerce, and by reason of the extraordinary hazard run by the lender. And in this case, the ship and tackle, if brought home, are answerable (as well as the person of the borrower) for the money lent. But if the loan is not upon the vessel, but upon the goods and merchandize, which must necessarily be sold or exchanged in the course of the voyage, then only the borrower, personally, is bound to answer the contract; who therefore, in this case, is said to take up the money at *respondentia*. These terms are also applied to contracts for the repayment of money borrowed, not on the ship and goods only, but on the mere hazard of the voyage itself; when a man lends a merchant 1000*l*. to be employed in a beneficial trade, with condition to be repaid with extraordinary interest, in case such a voyage be safely performed; which kind of agreement is sometimes called *fenus nauticum*, and sometimes *usura maritima*. But as this gave an opening for usurious and gaming contracts, especially upon long voyages, it was enacted by the statute 19 Geo. II. c. 37. that all monies lent on bottomry, or at *respondentia*, on vessels bound to or from the East Indies, shall be expressly lent only upon the ship, or upon the merchandize; that the lender shall have the benefit of

Bottom,
Bottomry.

Blackf.
Comment.

Bottony
||
Botts.

falvage; and that if the borrower has not on board effects to the value of the sum borrowed, he shall be responsible to the lender for so much of the principal as hath not been laid out, with legal interest and all other charges, though the ship and merchandize be totally lost.

BOTTONY. A cross bottony, in heraldry, terminates at each end in three buds, knots, or buttons, resembling, in some measure, the three-leaved grass; on which account Seoging, in his *Treſor Heraldique*, terms it *croix treflee*. It is the badge of the order of St Maurice. See *HERALDRY PLATE*.

BOTTRIGARO (Hercole), a person eminently skilled in the science of music, though not a musician by profession. He was a man of rank in Bologna; and appears, from several letters to him that have been printed, to have had the title of *count*. He published several controversial pieces on the subject of music. It seems that he entertained strong prejudices in favour of the ancient music; and that he attempted, as Vincentino and others had done, to introduce the chromatic genus into practice, but with no better success than had attended the endeavours of others. He corrected Gogavino's Latin version of Ptolemy in numberless instances; and that to so good a purpose, that Dr Wallis has in general conformed to it in that translation of the same author which he gave to the world many years after. He also translated into Italian *Boetius de Musica*, and as much of Plutarch and Macrobius as relates to music: besides this, he made annotations upon Aristoxenus, Franchinus, Spataro, Vincentino, Zarlino, and Galilei; and, in short, on almost every musical treatise he could lay his hands on, as appears by the copies which were once his own, and are now deposited in many libraries in Italy. Of Bottrigaro's works it is said, that they contain greater proofs of his learning and skill in music, than of his abilities as a writer, his style being remarkably inelegant: nevertheless, he affected the character of a poet; and there is extant a collection of poems by him, in 8vo, printed in 1557. Walther † represents him as an able mathematician, and a collector of rarities; and says that he was possessed of a cabinet, which the emperor Ferdinand II. had a great desire to purchase. He died in 1609.

BOTTS, in zoology, a species of worms which can be produced and nourished only in the intestines of a horse. It is there alone they can enjoy the proper temperature of heat, and receive the nourishment necessary for them.

Besides the long worms which have been observed in the bodies of horses, there are also short ones.—By these are to be understood what we call *botts*.

All authors, both ancient and modern, who have treated of the diseases of horses, have taken notice of these worms; but M. Vallisnieri is the first who has traced them to the last stage of their transformation, and has seen them change into a hairy kind of fly like the drone.

The flies from which these botts are produced inhabit the country, and do not come near houses, at least not near those of great towns; and therefore horses are never liable to have these worms (*i. e.* botts) in their bodies, if they have been kept in the house, especially in a town, during the summer and autumn.

It is in the former of these seasons, and perhaps too

in the beginning of the latter, that the females of these flies apply themselves to the anus of horses, and endeavour to gain admittance, in order there to deposit their eggs, or perhaps their worms.

The precise instant of their entrance will scarce admit of an eye-witness, but by the mere chance; yet M. Vallisnieri says, that Dr Gaspari had attained this very uncommon sight. The Doctor (he tells us) was one day looking at his mares in the field; and from being very quiet, he observed, that on a sudden they became very restless, and ran about in great agitation, prancing, plunging, and kicking, with violent motions of their tails. He concluded, that these extraordinary effects were produced by some fly buzzing about them, and endeavouring to settle upon the anus of one of them; but the fly not being able to succeed, he observed it to go off with less noise than before, towards a mare that was feeding at a distance from the rest; and now the fly taking a more effectual method to obtain its design, passed under the tail of the mare, and so made its way to the anus. Here at first it occasioned only an itching, by which the intestine was protruded with an increased aperture of the anus; the fly taking the advantage of this, penetrated further, and secured itself in the fold of the intestine:—this effected, it was in a situation proper for laying its eggs. Soon after this, the mare became very violent, running about, prancing, and kicking, and throwing herself on the ground; in short, was not quiet, nor returned to feeding, till after a quarter of an hour.

The fly then, we see, can find means of depositing its eggs, or perhaps its worms (*i. e.* botts), in the fundament of the horse; which once effected, it has done all that is necessary for them. If these bott worms are not hatched when first deposited in the horse, but are then only eggs, it will not be long before it happens, from the nutritive heat they there receive.

These bott worms soon make their way into the intestines of the horse: they occupy such parts of this region, as are to them most convenient; and sometimes (as we shall see presently) they penetrate even to the stomach. All the hazard they appear to be exposed to, is that of being carried away from the places they have fixed on by the excrement, which may seem likely to drive all before it. But nature has provided for all things; and when we shall have further described these bott worms, it will be seen that they are able to maintain their situation, and to remain in the body of the horse, as long as they please.

There is a time when these bott worms are of themselves desirous to leave their habitation, it being no longer convenient for them after the purposes of their growth are answered. Their transformation to a fly must be performed out of the horse's body: and accordingly, when the time of their transformation draws near, they approach towards the anus of the horse; and then leave him of their own accord, or with the excrement, with which they then suffer themselves to be carried along.

According to Mr de Reaumur's observations, the bott worms have two unequal claws, by which they are enabled to remain in the intestines of the horse in opposition to all efforts of the excrement to force them out.—These claws are a sort of anchor, differently disposed from those of common anchors, but contrived to pro-

Botts.

† Musical
Lexicon.

Botts,
Botwar.

produce the same effect. Besides these two claws, nature has given them a very great number of triangular spines or bristles, very sufficient to arm them against the coats of the intestines, and to resist the force employed to drive them towards the anus, provided the head be directed towards the stomach of the horse.

It will be asked, no doubt, if these bott worms are not dangerous to horses?—The mares which afforded Mr de Reaumur, for several years, those on which he made his observations, did not appear to be less in health than those which had none; but it may sometimes happen, that they are in so great a quantity in the body of the horse as to prove fatal to him. M. Vallisneri supposes these bott-worms to have been the cause of an epidemical disease that destroyed a great many horses about Verona and Mantua in the year 1713. —The observations communicated to him by Dr Gaspari sufficiently confirm his supposition. This gentleman, upon dissecting some horses that died of this distemper, found in their stomachs a surprising quantity of short worms; of which to give us some idea, he compares them to the kernels of a pomegranate opened: each of these, by gnawing on the coat of the stomach, had made for itself a kind of cellule therein, each of which would easily contain a grain of Indian wheat. It is easy to imagine by this means the stomach must be reduced to a wretched condition; the outer membranes were inflamed, and the inner ones ulcerated and corrupted; a very small quantity of these worms were found in the small intestines, and only a few in the larger, to which last they were found affixed, but had not corroded them. It is only perhaps when these bott worms are in great numbers, and thereby incommode each other in the intestines of the horse, that they make their way towards the stomach; and indeed a very few flies must be enough to overlook the inside of a horse, provided they should deposit all their eggs, and such should all be animated, M. Vallisneri having counted 700 and odd in the body of one single fly.

When one of these bots has left the anus of the horse, it falls on the ground; and immediately seeks out for some place of safety, where it may retire, to prepare for the last stage of its transformation, by which it is to become a fly. And now by degrees the skin hardens and thickens; and at length forms a solid shell or cocoon, the form of which scarce differs from that of the worm. It is first of a pale red colour, which changes into chestnut; and at length, by the addition of gradual and successive shades of brown, the shell is rendered black. The worm or bott, before it passes into a nymph, is of the form of an oblong ball; it remains in this form much longer than worms of the flesh fly kind. M. de Reaumur met with worms that retained this figure five or six days; as yet, one can perceive no traces of the legs, wings, and head of the nymph. Hence he first learned, that those bott worms do not become nymphs immediately upon their first change; but that, in order to become flies, they must undergo one change more than caterpillars ordinarily do to become butterflies.

For the cure of horses troubled with bots, see FARRIERY, § xv.

BOTWAR, a town of Germany, in the circle of Suabia, and subject to the duke of Wirtemberg. E. Long. 9. 15. N. Lat. 49. 0.

BOTZENBURG, a town of Germany, in the duchy or Mecklenburg. It had a castle, which was destroyed by the Danes in 1202. It is seated on the Elbe, and the vessels that pass by are obliged to pay a considerable toll. E. Long. 10. 48. N. Lat. 53. 34.

BOVA, an episcopal town of Italy, in the kingdom of Naples, seated near the Apennine mountains. E. Long. 16. 15. N. Lat. 37. 15.

BOUCHAIN, a fortified town of the French Netherlands, in the province of Hainault. It is divided into two parts by the river Scheld. It was taken by the French in 1676; and by the allies under the duke of Marlborough in 1711, which was the last military achievement of that great general; but the following year it was retaken by the French. E. Long. 3. 15. N. Lat. 50. 17.

BOUCHE OF COURT, the privilege of having meat and drink at court costfree. This privilege is sometimes only extended to bread, beer, and wine; and was anciently in use as well in the houses of noblemen, as in the king's court.

BOUCHET (John), a French poet and historian, flourished in the 16th century. The most considerable of his writings are the *Annals of Aquitaine*, and his *Chapelet des Princes*.

BOUDRY, a small town of Switzerland, in the province of Neuchâtel, and capital of a châtellainry of the same name. E. Long. 7. 5. N. Lat. 47. 11.

BOUFLERS (Lewis Francis, duke of), a peer and marshal of France, was born in 1644. He distinguished himself by his valour and conduct in several sieges and battles, and had the command of the right wing when the French were defeated at the bloody battle of Malplaquet. He died at Fontainebleau in 1711.—Marshal Boufflers, his son, died at Genoa, after having delivered that republic.

BOUGEANT (William Hyacinth), a famous Jesuit, first taught humanity at Caen and Nevers, and afterwards settled at the college of Lewis the Great, where he employed himself in writing several works; the principal of which were, 1. A collection of physical observations, extracted from the best authors. 2. An history of the wars and negotiations which preceded the treaty of Westphalia. 3. The female doctor, a philosophical amusement on the language of beasts, &c. He died in 1743.

BOUGH, denotes much the same with BRANCH.—Green boughs anciently made part of the decoration of altars and temples, especially on festival occasions. Oak boughs were offered to Jupiter; those of laurel, to Apollo; of olive, to Minerva; myrtle, to Venus; ivy, to Bacchus; pine, to Pan; and cypresses, to Pluto. Some make them the primitive food of mankind before acorns were invented.

BOUGIE. In the French language it signifies a wax candle, and is applied to a machine which (as the wax candle formerly was) is introduced into the urethra for removing obstructions there. Monf. Daran, a French surgeon, lately boasted of his introducing them as an improvement in his art, and acquired considerable profit by making and selling them. Scutetus, about the middle of the 17th century, used bougies in diseases of the urethra, and Monf. Daran probably took the hint from him. Different compositions have been used, and generally mercury was a part of them. Riverius made

Bougie,
Bouhours.Bouhours
of
Boulainvil-
liers.

made a plaster as follows: R. ol. oliv. lb iv. ceræ citrin. lb ii. minii & ceruss. aa lb iiss terreb. venet. & rez. alb. aa § iii m. Whether the bougies are made up of this or any other composition, they must be of different sizes, from the bigness of a knitting needle, to that of a goose quill. They are made of linen rags, spread with a proper matter, and then rolled up as follows. Having spread any quantity of the linen rag with the composition that is chosen for the purpose, cut it into slips from six to ten inches long, and from half an inch to an inch broad: then dextrously roll them on a glazed tile into the form of a wax candle; and, as the end of the bougie that is to be entered first into the urethra should be somewhat smaller than the rest, it would be as well to cut the slips a little tapering. It should also be observed, that when the bougies are rolled up, that side must be outward on which the plaster is spread.

Mons. Daran, and some others, attributed the action of their bougies to the composition they made use of in forming them. Mr Sharp apprehended, that as much of their efficacy was owing to the compression they made on the affected part, as to any other principle; and Mr Aiken very justly says, As it is evident that bougies of very different compositions succeed equally well in curing the same disorders in the urethra, it is plain that they do not act by means of any peculiar qualities in their composition, but by means of some property common to them all. This must be their mechanical form and texture, therefore their mode of action must be simple compression. The efficacy of mere compression in many cases of constriction is well known, from the use of sponge tents for widening parts that are straitened by cicatrices; and admitting obstructions in the urethra to be from a constriction formed by cicatrized ulcers, or a projection of the spongy substance of the urethra into the canal, we may easily conceive, that a gentle continued elastic compression will in time overcome the disease. We may also readily account for the inferior efficacy of metallic and whalebone bougies, from their not having the property of swelling with moisture, and therefore not making so equal a compression. As to bougies procuring a discharge of matter, there is no doubt but the mechanical stimulus of a foreign body in such a tender part, though free from disease, must produce it in some degree; and that this will be varied according to the chemically irritating quality of the composition, and the irritable state of the urethra: but it seems an absurdity to apply a topic, made uniform throughout, to the whole length of a canal, with a view of producing extraordinary effects upon a particular part of it, by means of some powerful quality in the ingredients. As to that part of the bougie which was in contact with the diseased part, being particularly covered with matter; this circumstance is probably owing to the greater irritation of that part of the urethra where the disorder is, than any other.

BOUHOURS (Dominic), a celebrated French critic, was born at Paris in 1628; and has been by some considered as a proper person to succeed Malherbe, who died about that time. He was entered into the society of Jesuits at the age of 16; and was appointed to read lectures upon polite literature in the college of Clermont at Paris, where he had studied: but he was so incessantly attacked with the head-ach, that he could not pursue the destined task. He afterwards undertook the

education of two sons of the duke of Longueville, which he discharged with great applause. The duke had such a regard for Bouhours, that he would needs die in his arms; and the "Account of the pious and Christian death" of this great personage was the first work which Bouhours gave the public. He was sent to Dunkirk to the Popish refugees from England; and, in the midst of his missionary occupations, found means to compose and publish books. Among these were, *Entretiens d'Ariste & d'Eugene*, or "Dialogues between Aristotle and Eugenius;" a work of a critical nature, and concerning the French-language. His book was printed no less than five times at Paris, twice at Grenoble, at Lyons, at Brussels, at Amsterdam, at Leyden, &c. and embroiled him in quarrels with a great number of censors, with Menage in particular, who, however, lived in friendship with our author before and after. The fame of this piece, and the pleasure he took in reading it, recommended Bouhours so effectually to the celebrated minister Colbert, that he trusted him with the education of his son the marquis of Segnelai. He wrote afterwards several other works; the chief of which are, 1. Remarks and doubts upon the French language. 2. Dialogues upon the art of thinking well in works of genius. 3. The life of St Ignatius. 4. The art of pleading in conversation. 5. The life of St Francis Xavier, apostle of the Indies and of Japan. This last work was translated from the French into English by Mr Dryden, and published at London in the year 1688, with a dedication prefixed to James II.'s queen.

BOUILLON, a town of France, in the duchy of the same name, and in the county of Luxemburg, with a fortified castle. The French took it in 1676; upon which it was given to the duke of Bouillon; but the king keeps the castle to himself, which is seated on a rock that is almost inaccessible. E. Long. 5. 20. N. Lat. 49. 45.

BOUILLON, in the menage, a lump or excrescence of flesh that grows either upon or just by the frush, inasmuch that the frush shoots out, just like a lump of flesh, and makes the horse halt; and this is called the *flesh blowing upon the frush*. Menage horses, that never wet their feet, are subject to these excrescences, which make them very lame. See FRUSH.

BOVINA AFFECTIO, a distemper of black cattle, caused by a worm lodged between the skin and the flesh, and perforating the same. This distemper is not mentioned by the ancient Greeks, and is but little known in Europe.

BOVINES, a small town of the Austrian Netherlands, in the province of Namur, seated on the river Maes or Meuse, in E. Long. 4. 50. N. Lat. 49. 45.

BOVINO, an episcopal town of Italy, in the Capitanata, seated at the foot of the Apennine mountains, in E. Long. 16. 15. N. Lat. 41. 17.

BOULAINVILLIERS (Henry de), Lord of St Saife, and an eminent French writer, was descended from a very ancient and noble family, and born at St Saife in 1658. His education was among the fathers of the oratory; where he discovered from his infancy those uncommon abilities for which he was afterwards distinguished. He applied himself principally to the study of history; and his performances in this way are numerous and considerable. He was the author of a history of the Arabians; Fourteen letters upon the ancient

Boulay
||
Boulogne.

cient parliaments of France; a History of France to the reign of Charles VIII.; the State of France, with historical memoirs concerning the ancient government of that monarchy, to the time of Hugh Capet, "written (says Mr Montequieu) with a simplicity and honest freedom worthy of that ancient family from which their author was descended." Mr Boulainvilliers died at Paris in 1722; and after his death was published his *Life of Mahomet*.

BOULAY (Cæsar Egasse du), in Latin *Buleus*, was born at St Ellier, a village of Maine in France; and became professor of humanity at the college of Navarre, regifter, rector, and hiftiographer of the univerfity of Paris. He died in 1678, after having published feveral works. The principal of them are, *A History of the Univerfity of Paris*, in Latin, 6 vols. folio; and the *Treasure of Roman Antiquities*, in 1 vol. folio.

BOULDER-WALL, a kind of wall built of round flints or pebbles, laid in strong mortar, and ufed where the fea has a beach caft up, or where there are plenty of flints.

BOULETTE, in the menage. A horfe is called *boulette*, when the fetlock, or pattern-joint, bends forward, and out of its natural fituation, whether thro' violent riding, or by reafon of being too short-jointed, in which cafe the leaft fatigue will bring it.

BOULONNE (Lewis), painter to the French king, and profeffor of the academy of painting, diftinguifhed himfelf by his art; and died at Paris in 1674, aged 65. There are three of his pictures in the church of Notre Dame.—He left two fons who were admired for their fkill in painting. The elder, who is well known under the name of *Bon Boulonne*, was firft inſtructed by his father; after which he went to perfect himfelf in Italy, and for that purpofe the king allowed him a penſion: at his return, he was made profeffor of the academy of painting. Lewis XIV. employed him in adorning feveral of his palaces; and there are a great number of his pictures at Paris. He died in 1717.—*Lewis Boulonne* his brother, after being alfo inſtructed by his father, gained the prize of painting at 18 years of age; upon which he obtained the king's penſion. He fet out for Italy at his brother's return, and acquired great ſkill in deſigning and colouring. At his return to Paris, he was much employed; and at length became director of the academy of paintings, knight of the Order of St Michael, and firft painter to the king. Lewis XIV. allowed him feveral penſions, and raiſed him and his poſterity to the rank of nobility. He embellifhed the church of the Invalids; the chapel of Verfailles, &c. and died at Paris in 1733.

BOULOGNE, a large and handſome town of Picardy in France, and capital of the Boulognois, with a harbour, and a biſhop's ſee. It is divided into two towns; the higher, and the lower. The former is ftrung both by nature and art; and the latter is only furrounded with a fingle wall. The harbour has a mole for the ſafety of the ſhips, which at the ſame time prevents it from being choaked up. The lower town is inhabited by merchants, and has three large ſtreets, one of which leads to the high town, and the other two run in a line on the ſide of the river. Many of the Engliſh and Scots reſide here, who, from a rebellion, or any other cauſe, are obliged to fly from their native country. E. Long. 1. 42. N. Lat. 50. 42.

Boulognois,
Koulier.

BOULOGNOIS, a territory of France, in the north part of Picardy, about 30 miles in length, and 20 in breadth. The chief town is Boulogne, and the chief trade is in pit-coal and butter.

BOULTER (Dr Hugh), was born in or near London, of reputable and wealthy parents. He was educated at Merchant-taylor's ſchool; and, before the Revolution, was from thence admitted a commoner of Chrift-church in Oxford. Some time after, he was choſen a demy of Magdalen-college, at the ſame election with Mr Addiſon and Dr Wilcox. From the merit and learning of the perſons elected, this was commonly called by Dr Hough, preſident of the college, the *golden election*. He afterwards became fellow of the ſame college; in which ſtation he continued in the univerſity till he was invited to London by Sir Charles Hodges, principal ſecretary of ſtate, in the year 1700, who made him his chaplain, and recommended him to Dr Teniſon archbiſhop of Canterbury; but his firſt preferences were owing to the earl of Sunderland, by whoſe intereſt and influence he was promoted to the parſonage of St Olave in Southwark, and the archdeaconry of Surry. Here he continued diſcharging very faithfully and diligently every part of his paſtoral office, till he was recommended to attend George I. as his chaplain, when he went to Hanover in 1719. He had the honour to teach prince Frederic the Engliſh language; and by his conduct he ſo won the king's favour, that he promoted him to the deanery of Chrift-church, and the biſhopric of Briſtol, in the ſame year. As he was viſiting his dioceſe five years afterwards, he received a letter from the ſecretary of ſtate, acquainting him that his majeſty had nominated him to the archbiſhopric of Armagh and primacy of Ireland. This honour he would gladly have declined; and deſired the ſecretary to uſe his good offices with his majeſty to excuſe him from accepting it. Ireland happened to be at this juncture in a great flame, occaſioned by Wood's ruinous project; and the miniſtry thought that the biſhop would greatly contribute to quench it by his judgment, moderation, and addreſs. The king therefore laid his abſolute commands upon him: to which he ſubmitted, but with ſome reluctance. As ſoon as he had taken poſſeſſion of the primacy, he began to conſider that country, in which his lot was caſt for life, as his own; and to promote its true intereſt with the greateſt zeal and aſſiduity. Accordingly, in innumerable inſtances, he exerted himſelf in the nobleſt acts of beneficence and public ſpirit. In ſeaſons of the greateſt ſcarcity, he was more than once inſtrumental in preventing a famine which threatened that nation. On one of theſe occaſions he diſtributed vaſt quantities of corn throughout the kingdom, for which the Houſe of Commons paſſed a vote of public thanks; and at another time 2500 perſons were fed at the poor-houſe in Dublin, every morning, and as many every evening, for a conſiderable time together, moſtly at the primate's expence. When ſchemes were propoſed for the advantage of the country, he encouraged and promoted them not only with his counſel but his purſe. He had great compaſſion for the poor clergy of his dioceſe, who were diſabled from giving their children a proper education; and he maintained ſeveral of the children of ſuch in the univerſity. He erected four houſes at Drogheda for the reception of clergymen's widows, and purchaſed an eſtate for the endow-

Boulton
Bounty.

endowment of them. His charities for augmenting small livings and buying glebes amounted to upwards of 30,000*l.* besides what he devoted by will for the like purposes in England. In short, the influences he gave of his generosity and benevolence of heart, his virtue, his piety, and his wisdom, are almost innumerable, and the history of his life is his noblest panegyric. This excellent prelate died at London, on the 2^d of June 1742; and was interred in Westminster abbey, where a beautiful monument of finely polished marble is erected to his memory.

BOULTINE, a term which workmen use for a moulding, the convexity of which is just one fourth of a circle; being the member just below the plinth in the Tuscan and Doric capital.

BOUNCE, in ichthyology, the English name of a species of squalus. See **SQUALUS**.

BOUND-BAILIFFS, are sheriffs officers for executing of process. The sheriffs being answerable for their misdemeanors, the bailiffs are usually bound in a bond for the due execution of their office; and thence are called *bound-bailiffs*, which the common people have corrupted into a much more homely appellation.

BOUNDS OF LANDS. See **ABUTTALS**.

BOUNTY, in commerce, a premium paid by government to the exporters of certain British commodities, as fail-cloth, gold and silver lace, silk-stockings, fish, corn, &c. The happy influence which bounties have on trade and manufactures is well known: nor can there be a more convincing proof of the good intentions of the government under which we live, than the great care that is taken to give all possible encouragement to those who shall establish, or improve, any hazardous branch of trade.

All undertakings, in respect either to mercantile enterprises, or in the establishment of manufactures, are weak and feeble in their beginnings; and if unsuccessful, either sink entirely, or at least are seldom revived in the same age. Accidents of this nature are not only destructive to private persons, but exceedingly detrimental to the public interest. On this principle, more especially since trade, for which Providence designed us, hath been attended to, such attempts have been thought deserving, and have been favoured with, public support. This in former times usually flowed from the crown, in the form of letters-patent, charters, or other grants of privileges, which, however requisite they might be, were notwithstanding very frequently objects of censure. If such as obtained them failed in their endeavours, they were reputed *projectors*; if, on the other hand, they succeeded, they were considered as *monopolizers*. Corporations, which imply the uniting certain individuals into a body, that they may thereby become more useful to the community, are created by the crown. Many of these were formed for promoting trade; and, according to the old system of our government, were necessary and useful. On the same principle, privileges were granted to private persons, on a suggestion, that what was immediately of use to them, would terminate in public utility. These also did good in bringing in many arts and manufactures; though, in some cases, tending to private interest more than public emolument, they were liable to legal correction. In later times, and in concerns of moment, a much better method has been adopted, as

often as it hath been found practicable, by rejecting private or particular interest, and proposing the designed advantages to such as should perform the stipulations on which they are granted. These bounties, as they are paid by the public, so they are solely calculated for the benefit of the public. They are sometimes given to encourage industry, and application in raising a necessary commodity; which was intended by the bounty on exporting corn. The intention of this bounty was to encourage agriculture; and the consequence hath been, that we now grow more than twice as much as we did at the establishment of the bounty; we even consume twice as much bread as we then grew; yet in A. D. 1697, we exported a fifteenth part of what we grew, of late years a twentieth-ninth part only. The bounty on this twenty-ninth part amounted to somewhat more than L 50,000, and the produce to more than L 400,000. It is evident that all this is so much clear gain to the nation. But this is far from being all that we have annually gained. For if our cultivation is doubled, as indeed it is, then the rent of lands, the subsistence of working hands, the profits of the tradesmen supplying them with utensils, clothes, the value of horses employed, &c. must all be taken into the account. Besides this we must add the freight (amounting to half the bounty), to make the idea of the advantages complete.

Sometimes bounties are given with a view to promote manufactures, as in the case of those made of silk. Many laws are to be found in our statute-books in favour of the silk manufacture, made with great wisdom and propriety, for the encouragement and support of many thousands of industrious persons employed therein. By statute 8 Geo. I. cap. 15. § 1. a bounty was given on the due exportation of ribbons and stuffs, of silk only, of three shillings upon a pound weight; silks, and ribbons of silk, mixed with gold and silver, four shillings a pound; on silk gloves, silk stockings, silk fringes, silk laces, and sewing silk, one shilling and three pence a pound; on stuffs of silk and program yarn, eight pence a pound; on silks mixed with incl or cotton, one shilling; on stuffs of silk mixed with worsted, six pence a pound, for three years: and, from experience of their utility, these were continued by subsequent statutes.

Sometimes bounties are given to support a new manufacture against foreigners already in possession of it, as in making linen and fail-cloth. The promoting of the manufacture of British fail-cloth was undoubtedly a very important national object, as the consumption was very large, and of consequence the purchase of it from foreigners an heavy expence on the public. Many methods were therefore devised, and countenanced by law, both here and in Ireland, for introducing and encouraging our own in preference to that of strangers, more especially in the royal navy. By stat. 12. Anne, cap. 16. § 2. a bounty was given of one penny per ell on all that was exported for a term, and continued by subsequent statutes. By 4 Geo. II. cap. 27. § 4. an additional bounty of another penny an ell is granted. These bounties were to be paid out of an additional duty on imported fail-cloth. By the same statute every ship built in Britain, or in the plantations, is, under the penalty of L 50. to be furnished with a complete suit of sails of British manufacture. The amount of these bounties

Campbell's
Political
Survey of
Britain.

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bounties mark the progress of the manufacture, which is also assisted by the fund on which the payment is assigned.

These assistances, however, are never bestowed but on mature deliberation, in virtue of strong proofs, and with a moral certainty of a rational benefit. The great intention of bounties is to place the British trader on such ground as to render his commerce beneficial to his country. In order to this, some profit must accrue to himself, otherwise he would not embark therein; but this, whatever it be, must prove inconsiderable in comparison of what results to the public. For if, by the help of such a bounty, one or many traders export to the value of 1000, 10,000, or 100,000 pounds worth of commodities or manufactures, whatever his or their profit or loss (for the latter, through avidity and overloading the market, sometimes happens) may be, the nation gains the L 1000, L 10,000, or L 100,000; which was the object of the legislature in granting the bounty. Upon this consideration, that the entire produce of what is exported accrues to the nation, the legislature, when an alteration of circumstances required it, have made no scruple of augmenting a bounty; as in the case of refined sugar exported, from three to nine shillings per hundred weight. In like manner, the original bounty of one pound per ton in favour of vessels employed in the whale-fishing hath been doubled, and many new regulations made, in order to render this fishery more advantageous to the public. As a bounty is given on malt when allowed to be exported, so an equivalent of 30 shillings per ton hath been granted on all British made malt-spirits when exported, which is a common benefit to land, manufacture, and commerce.

It is indeed true, that on whatever account, or to whatever amount, this reward is given, the public seem to pay, and private persons seem to receive. But these private persons receive it as the hire from the public, for performing a service which otherwise they would not perform, the benefit of which accrues to the public, and who can therefore very well afford to pay that reward in reality, which, as we have stated it, she only seems to do. For, looking a little closer, we cannot help observing, that the bounty is paid to individuals, who, as such, make a part of the public. But the commodities or manufactures exported are sold to foreigners; and the whole produce of them, be it what it will, comes into the purse of the public. By attending to this self-evident doctrine, every reasonable and public-spirited man will be easily reconciled to bounties; and the three following considerations will be sufficient to obviate the most common objections that have been made to the practice of giving them. 1. That no bounty can be desired but on the plea of national utility, which always deserves notice, and cannot be mistaken. It must likewise be alleged and proved, that this is the only means whereby the national benefit can be attained. 2. The sums issued on this account not only shew the clear expence of the bounty, but also indicate the profit gained by the public; for as the one cannot exist without the other, that amount must be the incontestable index of both. 3. It must be remembered, (and of this too some instances might be given), that if bounties should be improperly bestowed, they will of course prove ineffectual, and after a few fruit-

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less trials will remain unclaimed, and consequently produce no expence. There is indeed another objection which hath been made against the giving of bounties. This is grounded on the frauds to which they are supposed to be liable; and particularly the relanding of the goods on which the bounty hath been paid, and thereby deceiving and cheating the public. But whoever peruses the laws made on this head, and attentively considers the numerous precautions taken to fix every circumstance relative to the obtaining the bounty, the checks on the shipping of goods, the securities taken for their due exportation, the certificates required to ascertain their being actually delivered and sold in a foreign market, must be convinced, that to discharge all those securities, in case of an intended fraud, is a thing very difficult, if not impossible.

To these remarks we may add, that bounties are usually granted only for a limited time, and then expire; are always liable to be suspended; and of course can never be the cause of any great national loss. There is no doubt that, exclusive of frauds, the immoderate thirst of gain may tempt interested men to aim at converting what was calculated for public benefit to its detriment, for their own private advantage. Thus, on a prospect of short crops in other countries, men may take measures within the letter, but directly against the spirit of the law, to send so much of our corn abroad as to endanger a famine at home. For this the wisdom of parliament provides, not barely by suspending the bounty, but by prohibiting exportation and opening the ports for foreign supplies. We cannot with any shadow of justice ascribe scarcity to the bounty on the exportation. If this was the case, suspensions would be frequent, whereas there have been but five in a course of 70 years. If the bounty had any share, the larger the exportation, the greater would be the scarcity. In A. D. 1750 we exported more than one fifth of our growth of wheat, which was notwithstanding but at four shillings per bushel; whereas a century before, A. D. 1650, when we had neither bounty nor exportation, wheat was at nine shillings and sixpence per bushel. The causes of scarcity are unkindly seasons; which though human policy cannot prevent, yet their sad effects have been evidently lessened by our increased growth, since the taking place of bounty and exportation.

BOURBON, or MASCARENHAS, (isle of), an island in the Indian ocean, lying to the east of Madagascar, in E. Long. 58. 30. S. Lat. 21. 23. This island has no port, and is in some places inaccessible. Its length and breadth have not been well determined; but the circumference, according to the account of a person who resided there some time, is about 57 leagues. It is for the most part mountainous, but in some places there are very beautiful and fertile plains. In the south part of the island there is a burning mountain, which has thrown out vast quantities of bitumen, sulphur, and other combustible materials; neither does it cease throwing them out still, so that the country about it is useless, and is called by the inhabitants *payi brule*, that is, burnt land. The shore is high and rocky all round; but though on this account it hath no ports, there are several good roads, particularly one on the west, and another on the north-east. As to its form, this island is irregular, so that it is difficult to

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judge from the maps whether it is round or long. The air is equally pleasant and wholesome, inasmuch that the people live to a great age without feeling either infirmities or diseases. This is occasioned by the hurricanes, of which they have one or two every year. These purge and cleanse the air, so as to render it highly salubrious; the certainty of which is thus distinguished, that when they fail of making their annual visits, as sometimes they do, diseases and death find an entrance into the island, which otherwise would soon be overflocked with inhabitants. The climate is hot, but not to such a degree as might be expected from its situation, the breezes from the mountains being constant and very refreshing. The tops of these mountains are in winter covered with snow; which, melting in the summer, furnishes abundance of rivers and rivulets, with which the country is plentifully watered: so that the soil, though not very deep, is wonderfully fruitful, producing Turkey corn and rice twice a-year, and the latter in great abundance. Most sorts of cattle are found here, good in their kind, and are very cheap; wild goats and wild hogs are found in the woods and on the tops of the mountains; here also are vast quantities of wild fowl of different kinds, fish, and land tortoises, affording at once the most delicate and wholesome food. As to fruits, they have bananas, oranges, citrons, tamarinds, and other kinds; neither does it want valuable commodities, particularly ebony, cotton, white pepper, gum benzoin, aloes, and tobacco; all excellent in their kind, when compared with those of other countries. This island is also happy in its deficiencies; for no animals that are venomous are to be found therein, and only two sorts that are disagreeable to the sight, *viz.* spiders of the size of a pigeon's egg, which weave nets of a surprising strength, reckoned by some capable of being treated so as to become as valuable as silk; and bats of a most enormous size, which are not only skinned and eaten, but esteemed also the greatest delicacy that they have.

The island of Bourbon was discovered by the Portuguese in 1545, as appears by a date inscribed by them upon a pillar when they first landed; but when the French settled in Madagascar, this island was totally desolate. Three Frenchmen being banished thither, and left there for three years, made such a report of it at their return as surprised their countrymen. They lived most of that time upon pork; and though they were in a manner naked, yet they affirmed that they never had the least pain or sickness whatever. This tempted one Anthony Taureau to go over thither in 1654, accompanied by seven French and six negroes, who carried with them the cattle from which the island has been stocked ever since. The first thing they did was to erect the arms of France, by order of Mr Falcourt who was governor of Madagascar, and to bestow upon the island a new name. Then they set up huts, and laid out gardens, in which they cultivated melons, different sorts of roots, and tobacco; but just as the last became ripe, the whole plantation was destroyed by a hurricane. The French, however, went to work again; and by having some acquaintance with the climate, succeeded better, and added aloes to the rest of their plantations: but receiving no succour from Madagascar, and being tired of living by themselves in the isle of Bourbon, they very readily embraced the

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offer of an English captain, and in the year 1658 embarked for Madras. When the last great blow was given to the French at Madagascar by the natives, who surprised and cut them off in one night, there escaped as many men, as with their wives, who were natives, filled two canoes; and these being driven by the wind on the isle of Bourbon, were the next set of people who inhabited it. This last colony, for want of an opportunity to remove, were constrained to cultivate this new country of theirs, and to remain in it. It was not long before a further flock of inhabitants arrived. A pirate that had been committing depredations in the Indies, returning to Europe, ran ashore and was split to pieces upon the rocks, so that the crew were forced to join themselves to the former inhabitants; and as they had on board their vessel a great many Indian women whom they had made prisoners, they lived with them, and in process of time had a numerous posterity. As East India ships touched frequently here, when too late to double the Cape, many of the sailors, for the sake of the women, deserted at the time of their departure, and staying behind became planters in the isle of Bourbon. As the place grew more populous, the people naturally became more civilized, and desirous of living in a more commodious manner; which induced them to build small vessels, that in these they might sometimes make a trip to Madagascar, in order to purchase slaves, whom they employed in their plantations to cultivate aloes, tobacco, and other things, with which they drove a small trade, when ships of any nation anchored in their roads for the sake of refreshments. In this situation they were, when the French East India company put in their claim; and assuming the property of the island, sent thither five or six families and a governor. At first the inhabitants expected to reap some benefit from their new masters; but finding very little, and thinking the governor took too much upon him, they revolted at the instigation of a priest, seized their governor, and put him into a dungeon, where he died of hunger and grief. For this some of the ringleaders were punished, a kind of fort was erected, some guns placed on it, and the French flag kept flying; but, in other respects, so little care was taken, that, till within these 40 years, the island was in no state of defence.

The number of inhabitants, in the year 1717, was computed at 2000; *viz.* 900 free, and 1100 slaves. Amongst these people the usual distinction of whites and blacks entirely fails: for even the free are of different colours; and a French writer assures us, that he saw in a church one family, consisting of five generations, of all complexions. The eldest was a female, 108 years of age, of a brown black, like the Indians at Madagascar; her daughter, a mulatto; her grand-daughter, a mestizo; her great-grand-daughter, of a dusky yellow; her daughter, again, of an olive colour; and the daughter of this last, as fair as any English girl of the same age. These people are, generally speaking, of a gentle quiet disposition; very indolent; and submissive enough to authority, provided it is exercised with a tolerable degree of equity and decency: for otherwise the whole of them are apt to rise in rebellion at once; and the slaves have so little reason to complain of their masters, that they are always on the same side. The island is divided into four quarters. The first is that of St Paul, which is the largest

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largest and best peopled; their houses are built at the foot of a steep mountain, on both sides of a fresh-water lake. As for the plantations, they are on the top of a mountain, which they ascend by a very rough and troublesome passage. On the summit there is a spacious plain, a great part of which is divided into plantations of rice, tobacco, corn, sugar, and fruits. The quarter of St Denis lies seven leagues from that of St Paul, towards the east; and there the governor resides. It is not so well peopled as the former; but the country is more pleasant, and the situation better. At two leagues distance, proceeding along the sea-coast, is the quarter of St Mary's, which is but thinly peopled. The last and most fertile quarter is that of St Sufannah, which is at the distance of four leagues from St Denis. The road between these two quarters is tolerable, though part of it has been cut with much difficulty through a wood: but the passage from St Denis to St Paul is only by sea.

When the present company of India became, by their perpetual establishment, possessed of the island of Bourbon, they began to improve it exceedingly: raising new forts and batteries, so as to render it in a manner inaccessible; and importing coffee-trees from Arabia, which have succeeded so well, that it is believed they produce an eighth, according to some a sixth, part as much coffee as is raised in the kingdom of Yemen in Arabia, and it is likewise held next in goodness to that. — In 1763, the population amounted to 4627 white people, and 15149 blacks; the cattle consisted of 8702 heaves, 4084 sheep, 7405 goats, and 7619 hogs. Upon an extent of 125,909 acres of cultivated land, they gathered as much cassava as would feed their slaves, 1,135,000 pounds weight of corn, 84,4100 pounds of rice, 2,879,100 pounds of maize, and 2,535,100 pounds of coffee; which last the company bought up at about 3d. per pound.

In 1748, Admiral Boscawen appeared before this island with a British fleet; but found it so well fortified both by nature and art, that he was obliged, after some cannonading to very little purpose, to pursue his voyage.

BOURBON (Nicholas), a famous Latin poet in the 16th century, was a native of Vandœuvre near Langres, and the son of a wealthy man who was master of several forges. Margaret de Valois appointed him preceptor to her daughter Jane d'Albret of Navarre, the mother of king Henry IV. At length he retired to Conde, where he had a benefice, and died about the year 1550. He wrote eight books of Epigrams; and a poem on the forge, which he has intitled *Ferraria*. He had great knowledge of antiquity and of the Greek language. Erasmus praises his epigrams.

BOURBON (Nicholas), a celebrated Greek and Latin poet, was nephew of the preceding. He taught rhetoric in several colleges of Paris; and the cardinal de Perron caused him to be nominated professor of eloquence in the Royal College: he was also canon of Langres, and one of the 40 of the French academy. At length he retired to the fathers of the oratory, where he died in 1644, aged 70. He is esteemed one of the greatest Latin poets France has produced. His poems were printed at Paris in 1630.

BOURBON-Lancy, a town of France, in the duchy of Burgundy, and in the Autunnois. It is remarkable for

its castle and baths; and there is a large marble pavement, called the *great bath*, which is a work of the Romans. It is seated near the river Loire, in E. Long. 3. 46. N. Lat. 46. 37.

BOURBON L'Archambaud, a small town of France, remarkable for its baths, which are exceedingly hot. E. Long. 3. 28. N. Lat. 46. 35.

BOURBONE-LE-BAINS, a town of France in Champagne, and in the Bassigni, famous for its hot baths. E. Long. 5. 45. N. Lat. 47. 54.

BOURBONNOIS, a province of France, with the title of a duchy; bounded on the north, by Nivernois and Berry; on the west, by Berry and a small part of upper Marche; on the south, by Auvergne; and on the east, by Burgundy and Forez. It abounds in corn, fruits, pastures, wood, game, and wine. Its principal town is Moulins; and the rivers are the Loire, the Allier, and the Chur.

BOURBOURG, a town in French Flanders, whose fortifications are demolished. It is seated on a canal that goes to Dunkirk, in E. Long. 2. 15. N. Lat. 50. 55.

BOURCHIER (John), lord Bernars, grandson and heir of a lord of the same name, who was descended from Thomas of Woodstock, duke of Gloucester, and had been knight of the Garter, and constable of Windsor-castle, under Edward IV. Our lord John was created a knight of the Bath at the marriage of the duke of York second son of Edward IV. and was first known by quelling an insurrection in Cornwall and Devonshire, raised by Michael Joseph, a blacksmith, in 1495, which recommended him to the favour of Henry VII. He was captain of the pioneers at the siege of Therouenne, under Henry VIII. by whom he was made chancellor of the exchequer for life, lieutenant of Calais and the Marches, appointed to conduct the lady Mary the king's sister into France on her marriage with Lewis XII. and had the extraordinary happiness of continuing in favour with Henry VIII. for the space of 18 years. He died at Calais in 1532, aged 63. He translated, by king Henry's command, Froissart's Chronicle, which was printed in 1523, by Richard Pynson, the scholar of Caxton, and the fifth on the list of English printers. His other works were a whimsical medley of translations from French, Spanish, and Italian novels, which seem to have been the mode then, as they were afterwards in the reign of Charles II. These were, *The life of Sir Arthur, an Armorican knight*; *The famous exploits of Sir Hugh Bourdeaux; Marcus Aurelius*; and *The castle of love*. He composed also a book, *Of the duties of the inhabitants of Calais*; and a comedy entitled *Ite in Vinam*, which is mentioned in none of our catalogues of English plays. Anthony Wood says it was usually acted at Calais after vespers.

BOURDALOUE (Lewis), a celebrated preacher among the Jesuits, and one of the greatest orators France has produced, was born at Bourges, on the 20th of August 1632. After having preached at Provence, he, in 1699, went to Paris; and there met with such applause, that the king resolved to hear him: on which he was sent for to court, and frequently preached before Lewis XIV. He assisted the sick, visited the prisons and hospitals, and was very liberal in giving alms. He died at Paris on the 15th of May 1704. The best edition of his sermons is in octavo.

BOURDEAUX, an ancient, large, handsome, and rich

Bourbon
Bordeaux.

Bourdines
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Bourg.

Bourg
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Bourgogne.

rich town of France, capital of Guienne, an archbishop's see; has an university and an academy of arts and sciences. It is built in the form of a bow, of which the river Garonne is the string. This river is bordered by a large key, and the water rises four yards at full tide, for which reason the largest vessels can come up to it very readily. The castle called the *Trumpet*, is seated at the entrance of the quay, and the river runs round its walls. Most of the great streets lead to the quay; but are all very narrow except one. The town has 12 gates; and near another castle are fine walks under several rows of trees. The most remarkable antiquities were, an ancient temple dedicated to the tutelary gods, now entirely demolished, to make room for the fortifications; the palace of Gallienus built like an amphitheatre; and several aqueducts in different places. It is a town of very considerable trade, and they ship every year 100,000 tons of wine and brandy. This is the place where Edward the Black Prince resided several years; and his son, afterwards Richard II. was born here. There is a handsome square near the river, with an equestrian statue of Lewis XV. W. Long. o. 39. N. Lat. 44. 50.

BOURDINES, a town of the Austrian Netherlands, in the province of Namur. E. Long. 5. o. N. Lat. 50. 35.

BOURDELOT (John), a learned French critic, who lived at the close of the 16th and beginning of the 17th centuries. He distinguished himself by writing notes on Lucian, Petronius, and Heliodorus; by an Universal History; Commentaries on Juvenal; a Treatise on the Etymology of French words; and by some other works which were never published.—There was also an abbe Bourdelot, his sister's son, who changed his name from Peter Michon to oblige his uncle. He was a celebrated physician at Paris, who gained great reputation by a Treatise on the Viper, and other works. He died in 1685.

BOURDON (Sebastian), a famous painter, born at Montpellier, in 1619. He studied seven years at Rome; and acquired such reputation, that at his return to France he had the honour of being the first who was made rector of the academy of painting at Paris. He succeeded better in his landscapes than in his history-painting. His pieces are seldom finished; and those that are so, are not always the best. He once laid a wager with a friend, that he should paint 12 heads after the life, and as big as the life, in one day. He won it, and these are said not to be the worst things he ever did. He drew a vast number of pictures. His most considerable pieces are, The gallery of M. de Bretonvilliers, in the life of Notre Dame; and, The seven works of mercy, which he etched by himself. But the most esteemed of all his performances is, The martyrdom of St Peter, drawn for the church of Notre Dame: It is kept as one of the choicest rarities of that cathedral. Bourdon was a Calvinist; much valued and respected, however, in a Popish country, because his life and manners were good. He died in 1673, aged 54.

BOUDONNE, in heraldry, the same with POMEE.

BOURG, the capital of the island of Cayenne, a French colony on the coast of Guiana, in South America; in W. Long. 52. o. N. Lat. 5. o.

BOURG-en-Bresse, a town of France, and capital of Bresse, in the province of Burgundy. It is seated on the river Reussou, almost in the centre of Bresse, in

E. Long. 4. 19. N. Lat. 46. 13.

BOURG-sur-Mer, a sea-port town of France in Guienne, and in the Bourdeleois, with a tolerable good harbour; seated at the confluence of the rivers Dordogne and Garonne, in W. Long. 3. 35. N. Lat. 45. o.

BOURGES, an ancient and large town of France, the capital of Berry, an archbishop's see, and a famous university. The archbishop assumes the title of *Patriarch of the Aquitains*, and enjoys the rights of primacy with regard to Albi. It is seated between two small rivers, the Evry and the Orron, upon a hill that has a gentle descent down to these rivers, by which it is almost surrounded, for there is but one avenue to it by land, which is that of Port Bourbonnoux. It stands upon a great deal of ground: but one part of it is without houses; and the rest is but thinly peopled with gentlemen, students, and ecclesiastics, the whole number of souls amounting only to about 1800. They have no manner of trade but for their own necessities. It is divided into the old and new town. The walls of the old are almost entire, and the new town is almost as large as the old. There are several churches, convents, and nunneries. The parish church, dedicated to St Stephen, is a fine old Gothic structure: it is seated on the highest part of the city, and on each side of the front are two handsome high towers. The new one, which is built in the room of one which fell down, is almost 200 feet high. Bourbon square is the largest in the city, where there was formerly an amphitheatre, and now a market. There is a fine walk from St Michael's-gate into the fields, and three alleys, formed by four ranks of trees, the middlemost of which is spacious; besides which, there is a very long mall. The university is famous for the study of the law. This city stands almost in the centre of France. E. Long. 2. 30. N. Lat. 47. 10.

BOURGET, a town of Savoy, subject to the king of Sardinia, seated at the southern extremity of a lake of the same name. E. Long. 5. 55. N. Lat. 45. 45.

BOURGOGNE, or BURGUNDY, as we call it; a considerable province of France with the title of a duchy. It is 130 miles in length, and 75 in breadth. It is bounded on the east, by the Franche Comte; on the west, by Bourbonnois and Nivernois; on the south, by Lyonnais; and on the north, by Champagne. It is very fertile in corn and fruit, and produces excellent wine. It is watered by the rivers Seine, Dehune, Brebince, Armançon, Ouche, Souzon, Tille, and Saone. There are four mineral springs at Apoiny, Premeau, Bourbon-Lancy, and St Reine. The first are obscure, and the two last in high reputation. In the canton of Bresse, there are two subterranean lakes which often overflow in times of the greatest drought, and lay a large tract of ground under water: one of them has no apparent spring or opening; and yet in a dry season, it throws out water enough to overflow the meadow-land near it. The grottos or caves of Arcy are seated about 18 miles from Auxerre, and over them is soil about 10 feet deep. The entrance into these cavities is 200 paces long, but narrow. There are arches which form several vaults, from whence drop clear water, which turns into a brilliant hard stone. Twenty paces from the entrance is a lake, which seems to be formed by that part of the water that will not petrify. The highest of these vaults is not above eight feet. About 80 paces from

Bourguignons,
Bourignons.

from the entrance there is a kind of hall, with a coffee-coloured ceiling, wherein there are a thousand odd figures, which have a very agreeable effect. Dijon is the capital town.

BOURGUIGNONS, or BURGUNDIANS, one of the northern nations who over-ran the Roman empire, and settled in Gaul. They were of a great stature, and very warlike; for which reason the emperor Valentinian the Great engaged them in his service against the Germans. They lived in tents which were close to each other, that they might the more readily unite in arms on any unforeseen attack. These conjunctions of tents they called *burghs*; and they were to them what towns are to us. Sidonius Apollinaris tells us, that they were long hair, took great pleasure in singing, and were fond of praise for their vocal talents. He adds, that they ate great quantities; and anointed their hair with butter, deeming that unction very ornamental. Their crown was at first elective, and the authority of their kings expired with their success. They were not only accountable for their own misconduct, but likewise for the calamities of nature, and the caprice of fortune. They were deposed if they had lost a battle; if they succeeded ill in any enterprize; or if, in short, any great event had not corresponded with the hopes of the public. They were not more favourably treated in case of a bad harvest or vintage, or if any epidemical distemper had ravaged the state. At first they were governed by many kings, and *bendin* was the title of the royal dignity. But in latter times they were subjected to one sovereign; and they grew humane and civilized, especially when Christianity was propagated in their country. Before that epocha, their religion was much the same with that of the other northern nations. They had many priests, the chief of whom was distinguished by the name of *sinifleur*. He was perpetual, and they paid him great respect and veneration.

BOURIGNON (Antonietta), a famous enthusiastic preacher and pretended prophetess, was born at Lille in 1616. At her birth she was so deformed, that it was debated some days in the family whether it was not proper to stifle her as a monster: but her deformity diminishing, she was spared; and afterwards obtained such a degree of beauty, that she had her admirers. From her childhood to her old age she had an extraordinary turn of mind. She set up for a reformer, and published a great number of books filled with very singular notions; the most remarkable of which are intitled *The Light of the World*, and *The testimony of Truth*. She was an enemy to reason and common sense, which she maintained ought to give place to the illumination of divine faith; and asserted, that whenever any one was born again by embracing her doctrines, she felt the pains and throes of a woman in labour. Of her pretended visions and revelations we shall give one instance as a sample. In one of her ecstasies she saw Adam in the same form in which he appeared before his fall, and the manner in which he was capable of procreating other men, since he himself possessed in himself the principles of both sexes*. Nay, she pretended it was told her that he had carried this procreating faculty so far as to produce the human nature of Jesus Christ. "The first man (says she), whom Adam brought forth without any concurrent assistance in his glorified state, was chosen by God to be the throne of the Divinity; the or-

gan and instrument by which God would communicate himself externally to men: This is Christ the first born united to human nature, both God and man." Besides these and such like extravagancies, she had other forbidding qualities: her temper was morose and peevish, in which, however, she was not much unlike other devotees; but, contrary to the generality of such persons, she was extremely avaricious and greedy of amassing riches. She dressed like an hermit, and travelled to France, Holland, England, and Scotland. In the last she made a strong party, and some thousand sectarists, known by the name of *Bourignons*. She died at Fanecker in the province of Frise, October 30th, 1680. Her works have been printed in 18 vols octavo.

BOURN, a town of Lincolnshire in England, seated in E. Long. $\text{r. } 17$. N. Lat. $52. 40$. It is a pretty large place, has a good market for corn and provisions, and is noted for the coronation of king Edmund.

BOURO, an island in the East Indian ocean, between the Moluccas and Celebes. It is well cultivated; and is now subject to the Dutch, who have built a fortress here. Some mountains in it are exceeding high, and the sea on one side is uncommonly deep. It produces nutmegs and cloves, as well as cocoa and banana trees; besides many vegetables introduced by the Dutch. It is about 50 miles in circumference. E. Long. 129° . S. Lat. $4. 30$.

BOUTANT, or ARCH-BOUTANT, in architecture, an arch, or part of an arch, abutting against the reins of a vault to prevent its giving way.

A Pillar BOUTANT, is a large chain or pile of stone, made to support a wall, terrace, or vault.

BOUTE', in the menage. A horse is called *boute'*, when his legs are in a straight line from the knee to the coronet: short-jointed horses are apt to be *boute'*, and on the other hand long-jointed horses are not.

BOUTON, an island in the East Indian ocean, about 12 miles distant from the south-east part of the island of Macassar, or Celebes. The inhabitants are small, but well shaped, and of a dark olive complexion. The principal town is Callasjung, which is about a mile from the sea, on the top of a small hill, and round it a stone wall. The houses are not built upon the ground, but on posts. The religion of the inhabitants is Mahometanism. E. Long. $122. 30$. S. Lat. $4. 30$.

BOUVILLON, a city of Luxemburg in the Austrian Netherlands, situated in E. Long. $5. 0$. N. Lat. $49. 55$.

BOW, a weapon of offence made of steel, wood, horn, or other elastic substances, which after being bent by means of a string fastened to its two ends, in returning to its natural state, throws out an arrow with prodigious force.

The use of the bow is, without all doubt, of the earliest antiquity. It has likewise been the most universal of all weapons, having obtained among the most barbarous and remote people, who had the least communication with the rest of mankind.

The figure of the bow is pretty much the same in all countries where it has been used; for it has generally two inflections or bendings, between which, in the place where the arrow is drawn, is a right line. The Grecian bow was in the figure of a z , of which form we meet with many, and generally adorned with gold or silver. The Scythian bow was distinguished from the bows

* See the article *Adam*.

Bow.

bows of Greece and other nations, by its incurvation, which was so great as to form a half moon or semicircle.

Though it does not appear that the Romans made use of bows in the infancy of the republic, yet afterwards admitted them as hostile weapons, and employed auxiliary archers in all their wars.

In drawing back the bow, the primitive Grecians did not pull back their hand towards their right ear, according to the fashion of modern ages, and of the ancient Persians; but, placing their bow directly before them, returned their hand upon their right breast. This was also the custom of the Amazons.

The bow is a weapon of offence among the inhabitants of Asia, Africa, and America, at this day; and in Europe, before the invention of fire-arms, a part of the infantry were armed with bows. Lewis XI. first abolished the use of them in France, introducing in their place the halbard, pike, and broadsword. The long bow was formerly in great vogue in England, and many laws were made to encourage the use of it. The parliament under Henry VII. complained of the disuse of long bows, heretofore the safeguard and defence of this kingdom, and the dread and terror of its enemies.

Bow, is also an instrument used at sea, for taking the sun's altitude; consisting of a large arch of 90° graduated, a skank or staff, a side vane, a sight vane, and an horizon vane. It is now out of use.

Bow, among builders, a beam of wood or brags, with three long screws that direct a lathe of wood or steel to any arch; chiefly used in drawing draughts of ships and projections of the sphere, or wherever it is requisite to draw large arches.

Bow, in music, a small machine, which, being drawn over the strings of a musical instrument, makes it resound. It is composed of a small stick, to which are fastened 80 or 100 horse-hairs, and a screw which serves to give these hairs a proper tension. In order that the bow may touch the strings briskly, it is usual to rub the hairs with rosin. The ancients do not appear to have been acquainted with bows of *hair*: in lieu hereof they touched their instruments with a plectrum; over which our bows have great advantage, for giving long and short sounds, and other modifications which a plectrum cannot produce.

Bow, among artificers, an instrument so called from its figure; in use among gunsmiths, locksmiths, watch-makers, &c. for making a drill go. Among turners it is the name of that pole fixed to the ceiling, to which they fasten the cord that whirls round the piece to be turned.

Bow, a town of Devonshire in Wales, situated in W. Long. 4. o. N. Lat. 50. 45.

Bows of a *Saddle*, are two pieces of wood laid archwise to receive the upper part of a horse's back, to give the saddle its due form, and to keep it tight.

The fore-bow which sustains the pommel, is composed of the withers, the breasts, the points or toes, and the cording. See *WITHERS*, &c.

The hind-bow bears the trouquin or quilted roll. The bows are covered with sinews, that is with bull's pizzles beaten, and so run all over the bows to make them stronger. Then they are strengthened with bands of iron to keep them tight; and on the lower side are nailed on the saddle straps, with which they make fast

the girths.

Bow, *Epaule*, in ship-building, the rounding part of a ship's side forward, beginning at the place where the planks arch inwards; and terminated where they close, at the stem or prow. It is proved by a variety of experiments, that a ship with a narrow bow is much better calculated for sailing swiftly, than one with a broad bow; but is not so well fitted for a high sea, into which she always *pitcher*, or plunges her fore-part very deep, for want of sufficient breadth to repel the volume of water which the sea easily divides in her fall. The former of these is called by scamen a *lean*, and the other a *bluff* bow. "The bow which meets with the least resistance in a direct course, not only meets with the least resistance in oblique courses, but also has the additional property of driving the least to leeward; which is a double advantage gained by forming the bow so as to give it that figure which will be least resisted in moving through any medium *."

On the Bow, in navigation, an arch of the horizon comprehended between some distant object and that point of the compass which is right a-head, or to which the ship's stern is directed. This phrase is equally applicable when the object is beheld from the ship, or discovered by trigonometrical calculation: As, we saw a fleet at day-break bearing three points on the *starboard-bow*; that is, three points from that part of the horizon which is right a-head, towards the right hand *.

Bow-Legged, or Bandy-legged. Some children are bow-legged from their birth; others become so from setting them on their feet too early. The tibia of some is crooked; the knees of others are distorted; from a fault in the ankle, the feet of some are turned inwards. These are called *vari*; and in others, who are called *valgi*, they are turned outwards. The best method of preventing these disorders in weakly children is to exercise them duly, but not violently, by dancing or tossing them about in one's arms; and not setting them much upon their feet, at least not without properly supporting them: if the disorder attends at the birth, or increases after it is begun, apply emollients, then apply boots of strong leather, wood, &c. so as gradually to dispose the crooked legs to a proper form; or other instruments may be used instead of boots, which, when not too costly, are usually to be preferred. Slighter instances of these disorders yield to careful nursing, without instruments.

Bow-Line. See *BOWLING*.

Bow-Pieces, are the pieces of ordnance at the bow of a ship.

Rain-Bow. See *RAIN-BOW*.

Bow-Bearer, an inferior officer of the forest, who is sworn to make inquisition of all trespasses against vert or venison, and to attack offenders.

Bow-China. See *CHINA*.

BOWELS, in anatomy, the same with intestines *. * See *Anatomie*, n^o 354.

BOWER, in gardening, a place under covert of trees, differing only from an arbour, as being round or square, and made with a kind of dome or ceiling at top; whereas the arbour is always built long and arched.

BOWER, in the sea-language, the name of an anchor carried at the bow of a ship. There are generally two bowers, called *first* and *second*, *great* and *little*, or *best* and *small* bower. See *ANCHOR*.

BOWESS, or BOWET, in falconry; a young hawk, when

Bow

Bowell.

* *Bougners*
Truite de
Navire.

* See the ar-
ticle Bear-
ing.

when she draws any thing out of her nest, and covets to clamber on the boughs.

BOWL, denotes either a ball of wood, for the use of bowling; or a vessel of capacity, wherein to hold liquors.

BOWLDER-STONES, small stones, of a roundish figure, and no determinate size, found on the sea-shore, and on banks or rather channels of rivers.

BOWLING, the art of playing at bowls. The first thing to be observed in bowling is, the right chusing your bowl, which must be suitable to the ground you design to run on. Thus, for close alleys, the flat bowl is the best; for open grounds of advantage, the round biased bowl; and for plain and level swards, the bowl that is as round as a ball. The next is to chuse your ground; and, lastly, to distinguish the rifings, fallings, and advantages of the places where you bowl.

BOWLING, or *Bow-Line*, a rope fastened near the middle of the leech, or perpendicular edge of the square fails, by three or four subordinate parts called *bridles*. It is only used when the wind is so unfavourable that the fails must be all braced sideways, or close-hauled to the wind: in this situation the bow-lines are employed to keep the weather or windward edges of the principal fails tight forward and steady, without which they would always be shivering, and rendered incapable of service. To check the bow-line is to slacken it, when the wind becomes large.

BOWLING-BRIDLES, are the ropes by which the bow-line is fastened to the leech of the fail.

BOWSE, in the sea-language, signifies as much as to *hale* or *pull*. Thus *bowsing* upon a tack, is haling upon a tack. *Bowse away*, that is, Pull away all together.

BOWSPRIT, or **BOLTSPRIT**, a kind of mast, resting slopewise on the head of the main stern, and having its lower end fastened to the partners of the fore-mast, and farther supported by the fore-stay. It carries the sprit-sail, sprit-top-sail, and jak-staff; and its length is usually the same with that of the fore-mast.

BOWYERS, one of the ancient companies of the city of London. A bowyer dwelling in London, was always to have ready 50 bows of elm, hazle, or ash, well made and wrought, under the penalty of 10s. for every bow wanting; and to sell them at certain prices, under the penalty of 40s. And parents and masters were to provide for their sons and servants, a bow and two shafts, and cause them to exercise shooting, on pain of 6s. 8d. &c. by our ancient statutes.

BOX, in its most common acceptation, denotes a small chest or coffer for holding things.

Dice-Box, a narrow deep cornet, channelled within, wherein the dice are shaken and thrown. This answers to what the Romans called *fritillus*; whence, *crepitantes fritilli*; and, in Seneca, *resonante fritillo*. The same author uses also *concutere fritillum*, figuratively, for playing.—Besides the fritillus, the Romans, for greater security, had another kind of dice-box called *pyrgus*, *πυργος*, and sometimes *turricula*. It was placed immovable in the middle of the table, being perforated or open at both ends, and likewise channelled within; over the top was placed a kind of funnel, into which the dice were cast out upon the fritillus; whence descending, they fell through the bottom on the table; by which all practising on them with the fingers was

effectually prevented. For want of some contrivance of this kind, our sharpeners have opportunities of playing divers tricks with the box, as palming, topping, slabbing, &c.

Box, is also used for an uncertain quantity or measure: thus a box of quicksilver contains from one to two hundred weight; a box of prunella only 14 pounds; a box of rings for keys, two grofs, &c.

Box-Tree, in botany. See *Buxus*.

BOXERS, a kind of *athlete*, who combat or contend for victory with their fists. Boxers amount to the same with what among the Romans were called *pugiles*. The ancient boxers battled with great force and fury, inasmuch as to dash out each others teeth, break bones, and often kill each other. The strange disfigurements these boxers underwent were such that they frequently could not be known, and rendered them the subject of many raileries. In the Greek anthology there are four epigrams of the poet Lucilius, and one of Lucian, wherein their disfigurements are pleasantly enough exposed.

BOXHORNIIUS (Marc Zuerius), a learned critic, born at Bergen-op-Zoom in 1612, was professor of eloquence at Leyden, and at length of politics and history in the room of Heinsius. He published, 1. *Theatrum urbium Hollandiæ*. 2. *Scriptores historia Anguliæ, cum notis*. 3. *Poetæ satyrici minores, cum comment.* 4. Notes on Justin, Tacitus; and a great number of other works. He died in 1653, aged 41.

BOXING, the exercise of fighting with the fists, either naked, or with a stone or leaden ball grasped in them. In this sense, boxing coincides with the *πυγμαχία* of the Greeks, the *pugillatus* of the Romans, and what on our amphitheatres is sometimes called the *trial of manhood*. When the champions had *εσθλαί*, or balls, either of lead or stone, it was properly denominated *εσθλομαχία*. The ancient boxing differed from the *pugna castrorum*, in which the combatants had leathern thongs on their hands, and balls, to offend their antagonists; though this distinction is frequently overlooked, and fighting with the cestus reckoned a part of the business of *pugiles*: in which view we may discover three species of boxing; the first, where both the hands and the head are absolutely naked, as is practised among us; the second, where the hands were armed with *sphærae*, but the head naked; and the third, where the head was armed with a kind of cap or cover called *amphibolides*, chiefly to defend the ears and temples, the hands being also armed with cestuses. Boxing is an ancient exercise, having been in use in the heroic times before the invention of iron or other weapons. Those who prepared themselves for it, used all the means that could be contrived to render themselves fat and fleshy, that they might be better able to endure blows; whence corpulent men or women were usually called *pugiles*. Mr Burette† has given the history of the ancient pugilato, or boxing, with great exactness.

BOXING, among sailors, is used to denote the rehearsing the several points of the compass in their proper order.

BOXING is also used for the tapping of a tree to make it yield its juice. The boxing of maple is performed by making an hole with an ax or chissel into the side of the tree about a foot from the ground; out of it flows a liquor of which sugar is made.

Boxtehuide

Boyer.

BOXTEHUDE, a town of Germany, in the circle of Lower Saxony, subject to the Danes. It is seated on the rivulet Elße, which falls into the Elbe, in E. Long. 9. 35. N. Lat. 53. 40.

BOXTTEL, a town in Dutch Brabant, with sluices, seated on the river Bommel. E. Long. 5. 15. N. Lat. 51. 30.

BOYAR, a term used for a grandee of Russia and Transylvania. Becman says, that the boyars are the upper nobility; and adds, that the Czar of Muscovy, in his diplomas, names the boyars before the waywodes. See *WAYWODE*.

BOYAU, in fortification, a ditch covered with a parapet, which serves as a communication between two trenches. It runs parallel to the works of the body of the place; and serves as a line of contravallation, not only to hinder the sallies of the besieged, but also to secure the miners. But when it is a particular cut that runs from the trenches to cover some spot of ground, it is drawn so as not to be enfiladed or scoured by the shot from the town.

BOYD (Mark Alexander), an extraordinary genius, was son of Robert Boyd, who was eldest son of Adam Boyd of Pinkhill, brother to Lord Boyd. He was born in Galloway on the 13th of January 1562, and came into the world with teeth. He learned the rudiments of the Latin and Greek languages at Glasgow under two grammarians; but was of so high and intractable a spirit, that they despaired of ever making him a scholar. Having quarrelled with his masters, he beat them both, burnt his books, and forswore learning. While he was yet a youth, he followed the court, and did his utmost to push his interest there; but the fervour of his temper soon precipitated him into quarrels, from which he came off with honour and safety, though frequently at the hazard of his life. He, with the approbation of his friends, went to serve in the French army, and carried his little patrimony with him, which he soon dissipated at play. He was shortly after roused by that emulation which is natural to great minds, and applied himself to letters with unremitting ardour, till he became one of the most consummate scholars of his age. He is said to have translated Cæsar's Commentaries into Greek in the style of Herodotus, and to have written many Latin poems which were little inferior to the first productions of the Augustan age. He also left several manuscripts on philological, political, and historical subjects, in Latin and French, which languages were as familiar to him as his native tongue. He could with facility dictate to three amanuenses at the same time, in different languages, and on different subjects. He was also one of the best Scottish poets of the age. To all this we must add, that his personal beauty and accomplishments were equal to his mental superiority. He died at Pinkhill in Scotland, in 1601. The following works, which are all that have been printed, were published in *Delicie Poetarum Scotorum*; Amstel. 1637. 12mo. 1. *Epigrammata*, lib. ii. 2. *Heroidum Epistola* XIV. lib. i. 3. *Hymni* XIV.

BOYER (Abel), a well known glossographer and historiographer, born at Caîtres in France, in 1664. Upon the revocation of the edict of Nantz, he went first to Geneva, then to Franeker, where he finished his studies; and came finally to England, where he applied himself so closely to the study of the English language,

and made so great a proficiency therein, that he became an author of considerable note in it, being employed in the writing of several periodical and political works. He was for many years concerned in, and had the principal management of, a newspaper called the *Post-boy*. He likewise published a monthly work intitled the *Political state of Great Britain*. He wrote a life of queen Anne in folio, which is esteemed a very good chronicle of that period of the English history. But what has rendered him the most known, and established his name to the latest posterity, are the excellent Dictionary and Grammar of the French language, which he compiled, and which have been and still are reckoned the best in their kind. He also wrote, or rather translated from the French of M. de Racine, the tragedy of Iphigenia, which he published under the title of *the Victim*. It was performed with success at the theatre of Drury-lane, and is far from being a bad play.—Nor can there perhaps be a stronger instance of the abilities of its author, than success in such an attempt; since writing with any degree of correctness or elegance, even in prose, in a language which we were not born to the speaking of, is an excellence not very frequently attained; but to proceed so far in the perfection of it as to be even sufferable in poetry, and more especially in that of the Drama, in which the diction and manner of expression require a peculiar dignity and force, and in a language so difficult to attain the perfect command of as the English, is what has been very seldom accomplished. He died in 1729.

BOYER, in navigation, a kind of Flemish sloop, or small vessel of burden, having a boltsprit, a castle at each end, and a tall mast; chiefly fit for the navigation of rivers, and in many of its parts resembling a smack.

BOYES, idolatrous priests among the savages of Florida. Every priest attends a particular idol, and the natives address themselves to the priest of that idol to which they intend to pay their devotion. The idol is invoked in hymns, and his usual offering is the smoke of tobacco.

BOYLE (Richard), one of the greatest statesmen of the last century, and generally styled the *Great earl of Cork*, was the youngest son of Mr Roger Boyle, and was born at Canterbury, on the 3^d of October, 1566. He studied at Bennet college, Cambridge; afterwards became a student in the Middle Temple. Having lost his father and mother, and being unable to support himself in the prosecution of his studies, he became clerk to Sir Richard Manhood, one of the chief barons of the exchequer; but finding that by his employment he could not raise his fortune, he went to Ireland, in 1588, with fewer pounds in his pocket than he afterwards acquired thousands a year. He was then about 22, had a graceful person, and many accomplishments, which enabled him to render himself useful to several of the principal persons employed in the government, by drawing up for them memorials, cases, and answers. In 1595, he married Joan the daughter and coheir of William Ansfley, who had fallen in love with him; and the dying in labour of her first child, who was born dead, in 1599, left him an estate of 500*l.* a year in land. In consequence of various services, and the great abilities he displayed, he gradually rose to the highest offices, and even to the dignity of the peerage of Ireland; to which he was raised by king James I. on the 29th of Sep-

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September, 1616, by the style and title of *baron of Troughall*, in the county of Cork: four years after, he was created viscount Dungarvan and earl of Cork; and, in 1631, was made lord treasurer of Ireland, an honour that was made hereditary to his family. He particularly distinguished himself by the noble stand he made, when the fatal rebellion broke out in that kingdom, in the reign of Charles I.; and in his old age acted with as much bravery and military skill, as if he had been trained from his infancy to the profession of arms. He turned the castle of Lismore, his capital seat, into a fortress capable of demanding respect from the Irish. He immediately armed and disciplined his servants and Protestant tenants; and by their assistance, and a small army raised and maintained at his own expence, which he put under the command of his four sons, defended the province of Munster, and in the space of a year took several strong castles, and killed upwards of 3000 of the enemy: during which time he paid his forces regularly; and, when all his money was gone, like a true patriot, converted his plate into coin. This great man died on the 15th of September, 1634.

BOYLE (Richard), earl of Burlington and Corke, son to the former, was a nobleman of unblemished loyalty in rebellious times, and of untainted integrity in times of the greatest corruption. He was born at Youghall, October 20th, 1612, while his father was in the beginning of his prosperity, and only Sir Richard Boyle. He distinguished himself by his loyalty to king Charles I. He not only commanded troops, but raised and for a long time paid them, and continued to wait upon the king as long as any one place held out for him in England, and then was forced to compound for his estate. He contributed all in his power to the Restoration; on which king Charles II. raised him to the dignity of earl of Burlington, or Bridlington, in the county of York, in the year 1663. He died Jan. 15. 1697-8, in the 86th year of his age.

BOYLE (Roger), earl of Orrery, younger brother of the former, and the fifth son of Richard, styled the *Great earl of Cork*, was born April 25th, 1621; and, by the credit of his father with the lord deputy Faulkland, raised to the dignity and title of *baron Broghill*, when only seven years old. He was educated at the college of Dublin, where he soon distinguished himself as an early and promising genius. He afterwards made the tour of France and Italy; and at his return assisted his father in opposing the rebellious Irish, in which he behaved with all the spirit of a young, and all the discretion of an old, officer. Upon the murder of the king, he retired to Marlton in Somersetshire, and hid himself in the privacy of a close retirement: but being at length ashamed to sit the tame spectator of all the mischief that appeared round him, he resolved to attempt something in favour of the king; and, under the pretence of going to the Spa for the recovery of his health, he determined to cross the seas, and apply himself to king Charles II. for a commission to raise what forces he could in Ireland, in order to restore his majesty, and recover his own estate. To this purpose, he prevailed on the earl of Warwick to procure a licence for his going to the Spa; and having raised a considerable sum of money, came up to London to prosecute his voyage: but he had not been long in town when he received a message from Cromwell, who was then general of the

parliament's forces, that he intended to wait upon him. The lord Broghill was surprised at this message, having never had the least acquaintance with Cromwell; and desired the gentleman to let the general know, that he would wait upon his excellency. But while he was waiting the return of the messenger, Cromwell entered the room; and, after mutual civilities had passed between them, told him in few words, that the committee of state were apprized of his design of going over and applying to Charles Stuart for a commission to raise forces in Ireland; and that they were determined to make an example of him, if he himself had not diverted them from that resolution. The lord Broghill interrupted him, by assuring him that the intelligence which the committee had received was false, and that he neither was in a capacity nor had any inclination to raise disturbances in Ireland: but Cromwell, instead of making any reply, drew some papers out of his pocket, which were the copies of several letters which the lord Broghill had sent to those persons in whom he most confided, and put them into his hands. The lord Broghill, upon the perusal of these papers, finding it to no purpose to dissemble any longer, asked his excellency's pardon for what he had said, returned him his humble thanks for his protection against the committee, and intreated his direction how to behave in such a delicate conjuncture. Cromwell told him, that though till this time he had been a stranger to his person, he was not so to his merit and character: he had heard how gallantly his lordship had behaved in the Irish wars; and therefore, since he was named lord lieutenant of Ireland, and the reducing that kingdom was now become his province, he had obtained leave of the committee to offer his lordship the command of a general officer, if he would serve in that war; and he should have no oaths or engagements imposed upon him, nor be obliged to draw his sword against any but the Irish rebels.

The lord Broghill was infinitely surprised at so generous and unexpected an offer. He saw himself at liberty, by all the rules of honour, to serve against the Irish, whose rebellion and barbarities were equally detested by the royal party and the parliament. He desired, however, some time to consider of what had been proposed to him. But Cromwell briskly told him, that he must come to some resolution that very instant: that he himself was returning to the committee, who were still sitting; and if his lordship rejected their offer, they had determined to send him to the tower. Upon this, the lord Broghill, finding that his liberty and life were in the utmost danger, gave his word and honour that he would faithfully serve him against the Irish rebels: on which Cromwell once more assured him, that the conditions which he had made with him should be punctually observed; and then ordered him to repair to Bristol, adding, that he himself would soon follow him into Ireland. Lord Broghill, therefore, having settled the business of his command, went over into that country; where, by his conduct and intrepidity, he performed many important services, and fully justified the opinion Cromwell had conceived of him. By his own interest he now raised a gallant troop of horse, consisting chiefly of gentlemen attached to him by personal friendship; which corps was soon increased to a complete regiment of 1500 men. These he led into the field against the Irish rebels; and was speedily

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joined by Cromwell, who placed the highest confidence in his new ally, and found him of the greatest consequence to the interest of the commonwealth.

Among other considerable exploits performed by lord Broghill, the following deserves to be particularly mentioned. Whilst Cromwell laid siege to Clonwell, Broghill being detached to disperse a body of 5000 men who had assembled to relieve the place, he, with 2000 horse and dragoons, came up with the enemy at Macroom on the 10th of May 1650; and, without waiting for the arrival of his foot, immediately attacked and routed them, making their general prisoner. Then proceeding to the castle of Carrigdroghid, he sent a summons to the garrison to surrender before the arrival of his battering cannon, otherwise they were to expect no quarter. His own army was surprised at this summons, as knowing he had not one piece of heavy cannon: but Broghill had ordered the trunks of several large trees to be drawn at a distance by his baggage horses; which the besieged perceiving, and judging from the slowness of the motion that the guns must be of a vast bore, immediately capitulated. He afterwards relieved Cromwell himself at Clonwell, where that great commander happened to be so dangerously situated, that he confessed, nothing but the seasonable relief afforded him by lord Broghill could have saved him from destruction. When Ireton sat down before Limeric, he gave Broghill 600 foot and 400 horse, with orders to prevent lord Muskerry's joining the pope's nuncio, who had got together a body of 8000 men, and was determined to attempt the relief of Limeric. Muskerry was at the head of 1000 horse and dragoons, and about 2000 foot: notwithstanding which, lord Broghill fell resolutely upon him. The Irish, having the advantage of the ground and numbers, would have conquered, but for a stratagem of lord Broghill. In the heat of the action he desired those about him to repeat what he said; and then cried out as loud as he could, "They run, they run." The first line of the Irish looked round to see if their rear broke, and the rear seeing the faces of their friends, and hearing the shouts of the enemy, imagined that the first line was routed, and fled. The taking of Limeric, which put an end to the war in Ireland, was the consequence of this defeat.

When Cromwell became protector, he sent for lord Broghill, merely to take his advice occasionally. And we are told, that, not long after his coming to England, he formed a project for engaging Cromwell to restore the old constitution. The basis of the scheme was to be a match between the king (Charles II.) and the protector's daughter. As his lordship maintained a secret correspondence with the exiled monarch and his friends, it was imagined that he was beforehand pretty sure that Charles was not averse to the scheme, or he would not have ventured to have proposed it seriously to Cromwell; who at first seemed not to think it not unfeasible. He soon changed his mind, however, and told Broghill that he thought his project impracticable: "For (said he) Charles can never forgive me the death of his father." In fine, the business came to nothing, altho' his lordship had engaged Cromwell's wife and daughter in the scheme; but he never durst let the protector know that he had previously treated with Charles about it.

On the death of the protector, lord Broghill continued attached to his son Richard, till, when he saw that the honesty and good nature of that worthy man would

infallibly render him a prey to his many enemies, he did not think it advisable to sink with a man that he could not save. The dark clouds of anarchy seemed now to be hovering over the British island. Lord Broghill saw the storm gathering, and he deemed it prudent to retire to his command in Ireland, where he shortly after had the satisfaction of seeing things take a turn extremely favourable to the design he had long been well-wisher to, *viz.* that of the king's restoration. In this great event Lord Broghill was not a little instrumental; and, in consideration of his eminent services in this respect, Charles created him earl of Orrery by letters-patent bearing date Sept. 5th, 1660. He was soon after made one of the lords justices of Ireland; and his conduct, while at the head of affairs in that kingdom, was such as greatly added to the general esteem in which his character was held before.

His lordship's active and toilsome course of life at length brought upon him some diseases and infirmities which gave him much pain and uneasiness; and a fever which fell into his feet, joined to the gout with which he was often afflicted, abated much of that vigour which he had shewn in the early part of his life: but his industry and application were still the same, and bent to the same purposes; as appears from his letters, which shew at once a capacity, and an attention to business, which do honour to that age, and may serve as an example to this.

Notwithstanding his infirmities, on the king's desiring to see his lordship in England, he went over in 1665. He found the court in some disorder; where his majesty was on the point of removing the great earl of Clarendon, lord high chancellor; and there was also a great misunderstanding between the two royal brothers. Lord Orrery undertook to reconcile the king with the duke of York; which he effected by prevailing on the latter to ask his majesty's pardon for some slips he had taken in support of the lord chancellor.

On his return to Ireland, he found himself called to a new scene of action. The Dutch war was then at its height; and the French, in confederacy with the Hollanders, were endeavouring to stir up the ashes of rebellion in Ireland. The duke de Beaufort, admiral of France, had formed a scheme for a descent upon Ireland; but this was rendered abortive by the extraordinary diligence, military skill, and prudent measures, of lord Orrery.

But in midst of all his labours, a dispute arose, founded on a mutual jealousy of each other's greatness, betwixt him and his old friend the duke of Ormond, then lord lieutenant; the bad effects of which were soon felt by both disputants, who resorted to England to defend their respective interests and pretensions, both having been attacked by secret enemies who suggested many things to their prejudice. This quarrel, though of a private beginning, became at last of a public nature; and producing first an attempt to frame an impeachment against the duke of Ormond, occasioned in the end, by way of revenge, an actual impeachment against the earl of Orrery. He defended himself, however, so well against a charge of high crimes, and even of treason itself, that the prosecution came to nothing. He nevertheless lost his public employments; but not the king's favour: he still came frequently to court, and sometimes to council. After this revolution in his affairs, he made several voyages to and from Ire-

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land; was often consulted by his majesty on affairs of the utmost consequence; and on all occasions gave his opinion and advice with the freedom of an honest plain-dealing man and a sincere friend; which the king always found him, and respected him accordingly.

In 1678, being attacked more cruelly than ever by his old enemy the gout, he made his last voyage to England for advice in the medical way. But his disorder was beyond the power of medicine; and having, in his last illness, given the strongest proofs of Christian patience, manly courage, and rational fortitude, he breathed his last on the 16th of October 1679, in the 59th year of his age. His lordship wrote, 1. A work intitled *The art of war*. 2. *Parthenissa*, a romance, in one volume folio. 3. Several poems. 4. Dramatic pieces, two volumes. 5. *State-tracts*, in one volume folio, &c. Mr Walpole, speaking of this nobleman, says, he never made a bad figure but as a poet. As a soldier, his bravery was distinguished, his stratagems remarkable. As a statesman, it is sufficient to say, that he had the confidence of Cromwell. As a man, he was grateful, and would have supported the son of his friend: but, like Cicero, and Richelieu, he could not be content without being a poet; though he was ill qualified, his writings of that kind being flat and trivial.

BOYLE (Robert), one of the greatest philosophers as well as best men that our own or indeed any other nation has produced, was the seventh son and the 14th child of Richard earl of Cork, and born at Lismore in the province of Munster in Ireland, Jan. 25th, 1626-7. Before he went to school, he was taught to write a very fair hand, and to speak French and Latin, by one of the earl's chaplains, and a Frenchman that he kept in the house. In the year 1635, his father sent him over to England, in order to be educated at Eaton school, under Sir Henry Wotton, who was the earl of Cork's old friend and acquaintance. Here he soon discovered a force of understanding which promised great things, and a disposition to cultivate and improve it to the utmost. While he remained at Eaton, there were several very extraordinary accidents that befel him, of which he has given us an account; and three of which were very near proving fatal to him. The first was, the sudden fall of the chamber where he was lodged, when himself was in bed; when, besides the danger he run of being crushed to pieces, he had certainly been choked with the dust during the time he lay under the rubbish, if he had not had presence of mind enough to have wrapped his head up in the sheet, which gave him an opportunity of breathing without hazard. A little after this, he had been crushed to pieces by a starting horse that rose up suddenly, and threw himself backwards, if he had not happily disengaged his feet from the stirrups, and cast himself from his back before he fell. A third accident proceeded from the carelessness of an apothecary's servant, who, by mistaking the phials, brought him a strong vomit instead of a cooling jelly.

He remained at Eaton, upon the whole, between three and four years; and then his father carried him to his own seat at Stalbridge in Dorsetshire, where he remained for some time under the care of one of his chaplains who was the parson of the place. In 1638, he attended his father to London; and remained with him at the Savoy, till his brother Mr Francis Boyle

espoused Mrs Elizabeth Killigrew; and then, towards the end of October, within four days after the marriage, the two brothers Francis and Robert were sent abroad upon their travels, under the care of Mr Marcombes. They embarked at Rye in Suffex, and from thence proceeded to Dieppe in Normandy: then they travelled by land to Rowen, so to Paris, and from thence to Lyons; from which city they continued their journey to Geneva, where his governor had a family; and there the two gentlemen pursued their studies without interruption. Mr Boyle, during his stay here, refused his acquaintance with the mathematics, or at least with the elements of that science, of which he had before gained some knowledge. For he tells us in his own memoirs, that while he was at Eaton, and afflicted with an ague, before he was ten years old, by way of diverting his melancholy, they made him read *Amadis de Gaul*, and other romantic books, which produced such a selfishness in him, that he was obliged to apply himself to the extraction of the square and cube roots, and to the more laborious operations of algebra, in order to fix and settle the volatile operations of his fancy.

In September 1641, he quitted Geneva, after having spent 21 months in that city; and passing through Switzerland and the country of the Grisons, entered Lombardy. Then, taking his rout through Bergamo, Brescia, and Verona, he arrived at Venice; where having made a short stay, he returned to the continent, and spent the winter at Florence. Here he employed his spare hours in reading the modern history in Italian, and the works of the celebrated astronomer Galileo, who died in a village near this city during Mr Boyle's residence in it. It was at Florence that he acquired the Italian language; which he understood perfectly, though he never spoke it so fluently as the French. Of this indeed he was such a master, that as occasion required he passed for a native of that country in more places than one during his travels.

About the end of March 1642, he began his journey from Florence to Rome, which took up but five days. He surveyed the numerous curiosities of that city; among which, he tells us, "he had the fortune to see Pope Urban VIII. at chapel, with the cardinals, who, severally appearing mighty princes, in that assembly looked like a company of common friars." He visited the adjacent villages which had any thing curious or antique belonging to them; and had probably made a longer stay, had not the heats disagreed with his brother. He returned to Florence; from thence to Leghorn; and so by sea to Genoa: then passing through the county of Nice, he crossed the sea to Antibes, where he fell into danger from refusing to honour the crucifix: from thence he went to Marseilles by land. He was in that city, in May 1642, when he received his father's letters, which informed him that the rebellion had broken out in Ireland, and how difficultly he had procured the £250 then remitted to them in order to help them home. They never received this money; and were obliged to go to Geneva with their governor Marcombes, who supplied them with as much at least as carried them thither. They continued there a considerable time, without either advice or supplies from England; upon which, Marcombes was obliged to take up some jewels upon his own credit, which were afterwards disposed of with as little loss as might be;

and with the money thus raised, they continued their journey for England, where they arrived in the year 1644. On their arrival, Mr Boyle found his father dead; and though the earl had made an ample provision for him, by leaving him his manor of Stalbridge in England, as well as other considerable estates in Ireland, yet it was some time before he could receive any money. However, he procured protections for his estates in both kingdoms from the powers then in being; from which he also obtained leave to go over to France for a short space, probably to settle accounts with his governor Mr Marcombes.

In March 1646, he retired to his manor at Stalbridge, where he resided for the most part till May 1650. He made excursions sometimes to London, sometimes to Oxford; and in February 1647, he went over to Holland; but he made no considerable stay any where. During his retirement at Stalbridge, he applied himself with incredible industry to studies of various kinds, to those of natural philosophy and chemistry in particular. He omitted no opportunity of obtaining the acquaintance of persons distinguished for parts and learning; to whom he was in every respect a ready, useful, generous assistant, and with whom he held a constant correspondence. He was also one of the first members of that small but learned body of men which, when all academical studies were interrupted by the civil wars, secreted themselves about the year 1645; and held private meetings, first in London, afterwards at Oxford, for the sake of canvassing subjects of natural knowledge upon that plan of experiment which Lord Bacon had delineated. They styled themselves then *The philosophical college*; and after the Restoration, when they were incorporated and distinguished openly, they took the name of the *Royal Society*.

In the summer of 1654, he put in execution a design he had formed for some time of residing at Oxford, where he chose to live in the house of one Mr Crosse, an apothecary, rather than in a college, for the sake of his health, and because he had more room to make experiments. Oxford was indeed the only place at that time in England where Mr Boyle could have lived with much satisfaction; for here he found himself surrounded with a number of learned friends, such as Wilkins, Wallis, Ward, Willis, Wren, &c. suited exactly to his taste, and who had resorted thither for the same reasons that he had done, the philosophical society being now removed from London to Oxford. It was during his residence here that he improved that admirable engine the air-pump; and by numerous experiments was enabled to discover several qualities of the air, so as to lay a foundation for a complete theory. He was not, however, satisfied with this; but laboured incessantly in collecting and digesting, chiefly from his own experiments, the materials requisite for this purpose. He declared against the philosophy of Aristotle, as having in it more of words than things; promising much, and performing little; and giving the inventions of men for indubitable proofs, instead of building upon observation and experiment. He was so zealous for, and so careful about, this true method of learning by experiment, that, though the Cartesian philosophy then made a great noise in the world, yet he would never be persuaded to read the works of Des Cartes, for fear he should be amused and led away by plausible accounts of things founded on

conjecture, and merely hypothetical. But philosophy, and inquiries into nature, though they engaged his attention deeply, did not occupy it entirely; since we find that he still continued to pursue critical and theological studies. In these he had the assistance of some great men, particularly Dr Edward Pocock, Mr Thomas Hyde, and Mr Samuel Clarke, all of great eminence for their skill in the oriental languages. He had also a strict intimacy with Dr Thomas Barlow, at that time head keeper of the Bodleian library, and afterwards bishop of Lincoln, a man of various and extensive learning. In the year 1659, Mr Boyle, being acquainted with the unhappy circumstances of the learned Sanderfon, afterwards bishop of Lincoln, who had lost all his preferences on account of his attachment to the royal party, conferred upon him an honorary stipend of 50l. a-year. This stipend was given as an encouragement to that excellent master of reasoning to apply himself to the writing of "*Cases of Conscience*;" and accordingly he printed his lectures *De obligatione conscientie*, which he read at Oxford in 1647, and dedicated them to his friend and patron.

Upon the restoration of Charles II. Mr Boyle was treated with great civility and respect by the king, as well as by the two great ministers the lord treasurer Southampton and the lord chancellor Clarendon. He was solicited by the latter to enter into holy orders, not only out of regard to him and his family, but chiefly with a view to serve the church itself; for Mr Boyle's noble family, his distinguished learning, and above all his unblemished reputation, induced Lord Clarendon to think that any ecclesiastical preferments he might attain would be worthily discharged, so as to do honour to the clergy, and service to the established communion. Mr Boyle considered all this with due attention: but, to balance these, he reflected, that, in the situation of life in which he was, whatever he wrote with respect to religion would have so much the greater weight as coming from a layman; since he well knew that the irreligious fortified themselves against all that the clergy could offer, by supposing, and saying, that it was their trade, and that they were paid for it. He considered likewise, that, in point of fortune and character, he needed no accessions; and indeed he never had any appetite for either. He chose, therefore, to pursue his philosophical studies in such a manner as might be most effectual for the support of religion; and began to communicate to the world the fruits of these studies.

The first of these was printed at Oxford in 1660, in 8vo, under the title of, 1. *New experiments, physico-mechanical, touching the spring of the air and its effects*. 2. *Seraphic love*; or some motives and incentives to the love of God, pathetically discoursed of in a letter to a friend. 3. *Certain physiological essays and other tracts*, 1661, 4to. 4. *Sceptical chemist*, 1662, 8vo; a very curious and excellent work, reprinted about the year 1679, 8vo, with the addition of divers experiments and notes about the producibleness of chemical principles.

In the year 1663, the royal society being incorporated by king Charles II. Mr Boyle was appointed one of the council; and as he might be justly reckoned among the founders of that learned body, so he continued one of the most useful and industrious of its members

bers during the whole course of his life. In June 1663, he published, 5. Considerations touching the usefulness of experimental natural philosophy, 4to. 6. Experiments and considerations upon colours; to which was added a letter containing Observations on a diamond that shines in the dark, 1663, 8vo. This treatise is full of curious and useful remarks on the hitherto unexplained doctrine of light and colours; in which he shews great judgment, accuracy, and penetration; and may be said to have led the way to that mighty genius the great Sir Isaac Newton, who has since set that point in the clearest and most convincing light. 7. Considerations on the style of the Holy Scriptures, 1663, 8vo. It was an extract from a larger work, intitled *An essay on scripture*; which was afterwards published by Sir Peter Pett, a friend of Mr Boyle's.

In 1664, he was elected into the company of the royal mines; and was all this year taken up in the prosecution of various good designs, which probably was the reason why he did not send abroad any treatises either of religion or philosophy. The year following, came forth, 8. Occasional reflections upon several subjects; whereto is prefixed a discourse about such kind of thoughts, 1665, 8vo. This piece is addressed to *Sophronia*, under whose name he concealed that of his beloved sister the viscountess of Ranelagh. The thoughts themselves are on a vast variety of subjects, written many years before; some indeed upon trivial occasions, but all with great accuracy of language, much wit, more learning, and in a wonderful strain of moral and pious reflection. Yet this exposed him to the only severe censure that ever was passed upon him; and that too from no less a man than the celebrated Dean Swift, who, to ridicule these discourses, wrote *A pious meditation upon a broomstick, in the style of the Honourable Mr Boyle*. But, as his noble relation the late Lord Orrery has said, "to what a height must the spirit of farcicalm arise in an author, who could prevail on himself to ridicule so good a man as Mr Boyle? The sword of wit, like the scythe of time, cuts down friend and foe, and attacks every object that lies in its way. But, sharp and irresistible as the edge of it may be, Mr Boyle will always remain invulnerable."

The same year, he published an important work intitled, 9. New experiments and observations upon cold, 1665, 8vo. In the year 1666, he published, 10. Hydrostatical paradoxes made out by new experiments, for the most part physical and easy, in 8vo. 11. The origin of forms and qualities, according to the corporeal philosophy, illustrated by considerations and experiments. This treatise did great honour to Mr Boyle, whether we consider the quickness of his wit, the depth of his judgment, or his indefatigable pains in searching after truth. We must not forget to observe, that, both in this and the former year, he communicated to his friend Mr Oldenburgh, who was secretary to the royal society, several curious and excellent short treatises of his own, upon a great variety of subjects, and others transmitted to him by his learned friends both at home and abroad, which are printed and preserved in the Philosophical Transactions.

In the year 1668, Mr Boyle resolved to settle in London for life; and removed for that purpose to the house of his sister, the lady Ranelagh, in Pall-Mall. This was to the infinite benefit of the learned in gene-

ral, and particularly to the advantage of the royal society, to whom he gave great and continual assistance, as the several pieces communicated to them from time to time, and printed in their Transactions, do abundantly testify. Those who applied to him, either to desire his help, or to communicate to him any new discoveries in science, he had his set hours for receiving; otherwise, it is easy to conceive that he would have had very little of his time for himself. But, besides these, he kept a very extensive correspondence with persons of the greatest figure, and most famous for learning, in all parts of Europe. In the year 1669, he published, 12. A continuation of new experiments touching the weight and spring of the air; to which is added, A discourse of the atmospheres of consistent bodies: and the same year he revised and made many additions to several of his former tracts, some of which were now translated into Latin, in order to gratify the curious abroad. 13. Tracts about the comical qualities of things; comical suspensions; the temperature of the subterraneous regions; the bottom of the sea: to which is prefixed an introduction to the history of particular qualities. This book occasioned much speculation, as it seemed to contain a vast treasure of knowledge which had never been communicated to the world before; and this too grounded upon actual experiments, and arguments justly drawn from them, instead of that notional and conjectural philosophy which in the beginning of the 17th century had been so much in fashion.

In the year 1671, he published, 14. Considerations on the usefulness of experimental and natural philosophy; the second part; 4to. And, 15. A collection of tracts upon several useful and important points of practical philosophy, 4to. Both of which works were received as new and valuable gifts to the learned world. 16. An essay about the origin and virtues of gems, 1672, 8vo. 17. A collection of tracts upon the relation between flame and air; and several other useful and curious subjects; besides furnishing, in this and the former year, a great number of short dissertations upon a vast variety of topics, addressed to the royal society, and inserted in their Transactions. 18. Essays on the strange subtilty, great efficacy, and determinate nature, of effluvia; to which were added a variety of experiments on other subjects; 1673, 8vo. 19. A collection of tracts upon the saltness of the sea, the moisture of the air, the natural and preternatural state of bodies; to which is prefixed a dialogue concerning cold; 1674, 8vo. 20. The excellency of theology compared with philosophy, 1673, 8vo. This discourse was written in the year 1665, while Mr Boyle, to avoid the great plague which then raged in London, was forced to go from place to place in the country, and had little or no opportunity of consulting his books. It contains a great number of curious and useful, as well as just and natural, observations. 21. A collection of tracts containing suspensions about hidden qualities of the air; with an appendix touching celestial magnets; animal-versions upon Mr Hobbes's problem about a vacuum; a discourse of the cause of attraction and fusion; 1674, 8vo. 22. Some considerations about the reconcilableness of reason and religion. By T. E. a layman. To which is annexed a discourse about the possibility of the resurrection. By Mr Boyle. 1675, 8vo. The reader must be informed, that both these pieces were of his writing;

writing; only he thought fit to mark the former with the final letters of his name. Among other papers that he communicated this year to the royal society, there were two connected into one discourse: the first was intitled An experimental discourse of quicksilver growing hot with gold; the other related to the same subject; and both of them contained discoveries of the utmost importance.

In the year 1676, he published, 23. Experiments and notes about the mechanical origin or production of particular qualities, in several discourses on a great variety of subjects, and among the rest on electricity. In 1678, he communicated to Mr Hooke a short memorial of some observations made upon an artificial substance that shines without any preceding illumination; which that gentleman thought fit to publish in his *Lectiones Cutlerianæ*. 24. Historical account of a degradation of gold made by an anti-elixir. This made a great noise both at home and abroad, and is looked upon as one of the most remarkable pieces that ever fell from his pen; since the facts contained in it would have been esteemed incredible, if they had been related by a man of less integrity and piety than Mr Boyle. The regard which the great Newton had for Mr Boyle, appears from a very curious letter, which the former wrote to him, at the latter end of this year, for the sake of laying before him his sentiments of that etherial medium, which he afterwards considered, in his Optics, as the cause of gravitation. This letter is to be found in the life of our author by the reverend Dr Birch.

In the year 1680, Mr Boyle published, 25. The aerial noëtiluca; or some new phenomena, and a process of a factitious self-thinging substance, 8vo. This year the Royal Society, as a proof of the just sense of his great worth, and of the constant and particular services, which through a course of many years he had done them, made choice of him for their president; but he being extremely, and, as he says, peculiarly tender in point of oaths, declined the honour done him, by a letter addressed to "his much respected friend Mr Robert Hooke, professor of mathematics at Gresham College." 26. Discourse of things above reason; inquiring, whether a philosopher should admit any such, 1681, 8vo. 27. New experiments and observations upon the icy noëtiluca: to which is added a chemical paradox, grounded upon new experiments, making it probable that chemical principles are transmutable, so that out of one of them others may be produced, 1682, 8vo. 28. A continuation of new experiments, physico-mechanical, touching the spring and weight of the air, and their effects, 1682, 8vo. In 1683, he published nothing but a short letter to Dr Beale, in relation to the making of fresh water out of salt. In 1684, he published two very considerable works, viz. 29. Memoirs for the natural history of human blood, especially the spirit of that liquor, 8vo; and, 30. Experiments and considerations about the porosity of bodies, 8vo.

In 1685, Mr Boyle obliged the world with, 31. Short memoirs for the natural experimental history of mineral waters, with directions as to the several methods of trying them; including abundance of new and useful remarks, as well as several curious experiments. 32. An essay on the great effects of even languid and unheeded motion; whereunto is annexed an experimental discourse of some hitherto little regarded causes of the sa-

lubrity and insalubrity of the air, and its effects. None of his treatises, it is said, were ever received with greater or more general applause than this. 33. Of the reconcilableness of specific medicines to the corpuscular philosophy; to which is annexed a discourse about the advantages of the use of simple medicines; 8vo. Besides these philosophical tracts, he gave the world, the same year, an excellent theological one, 34. Of the high veneration man's intellect owes to God, peculiarly for his widom and power, 8vo.

At the entrance of the succeeding year, came abroad his, 35. Free inquiry into the vulgarly received notion of nature; a piece which was then, and will always be, greatly admired by those who have a true zeal and relish for pure religion and philosophy. In 1687, he published, 36. The martyrdom of Theodora and Didymia; a work he had drawn up in his youth. 37. A disquisition about the final causes of natural things; wherein it is inquired, whether, and (if at all) with what caution, a naturalist should admit them; with an appendix about vitiated light; 1688, 8vo. In the month of May this year, our author, though very unwillingly, was constrained to make his complaint to the public, of some inconveniences under which he had long laboured; and this he did by an advertisement, about "the loss of many of his writings addressed to J. W. to be communicated to those of his friends that are virtuosi; which may serve as a kind of preface to most of his mutilated and unfinished writings." He complains in this advertisement of the treatment he had met with from plagiarists both at home and abroad; and though it might have been difficult in any other man to have done so without incurring the imputation of self-conceit and vanity, yet Mr Boyle's manner is such as only to raise in us an higher esteem and admiration of him. This advertisement is inserted at length in his life by Birch.

He began now to find that his health and strength, notwithstanding all his care and caution, gradually declined, as he observes in a letter to Mr Le Clerc, dated May 30th, 1689; which put him upon using every possible method of husbanding his remaining time for the benefit of the learned. It was with this view that he no longer communicated particular discourses, or new discoveries, to the royal society; because this could not be done without withdrawing his thoughts from tasks which he thought of still greater importance. It was the more steadily to attend to these, that he resigned his post of governor of the corporation for propagating the gospel in New-England; nay, he went so far as to signify to the world that he could no longer receive visits as usual, in an advertisement which begins in the following manner: "Mr Boyle finds himself obliged to intimate to those of his friends and acquaintance, that are wont to do him the honour and favour of visiting him, 1. That he has by some unlucky accidents, namely, by his servant's breaking a bottle of oil of vitriol over a chest which contained his papers, had many of his writings corroded here and there, or otherwise so maimed, that without he himself fill up the lacunæ out of his memory or invention, they will not be intelligible. 2. That his age and tickliness have for a good while admonished him to put his scattered and partly defaced writings into some kind of order, that they may not remain quite useless. And, 3. That his skilful and friendly physician, Sir Edmund King, seconded by Mr Boyle's

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Boyle's best friends, has pressingly advised him against speaking daily with so many persons as are wont to visit him, representing it as what cannot but waste his spirits, &c. He ordered likewise a board to be placed over his door, with an inscription signifying when he died, and when he did not, receive visits."

Among the other great works, which by this means he gained time to finish, there is great reason to believe, that one was, a collection of elaborate processes in chemistry; concerning which he wrote a letter to a friend, which is still extant; wherein we read, that "he left it as a kind of hermetic legacy to the studious disciples of that art." Besides these papers committed to the care of one whom he esteemed his friend, he left very many behind him at his death, relating to chemistry; which, as appears by a letter directed to one of his executors, he desired might be inspected by three physicians whom he named, and that some of the most valuable might be preserved.

In the mean time, Mr Boyle published some other works before his death; as, 38. *Medicina Hydrostatica*; or, Hydrostaticks applied to the materia medica, shewing, how by the weight that divers bodies used in physic have in water, one may discover whether they be genuine or adulterated. To which is subjoined a previous hydrostatical way of estimating ores. 1690, 8vo. 39. The christian virtuoso; shewing, that by being addicted to experimental philosophy, a man is rather assisted than indisposed to be a good Christian. To which are subjoined, 1. A discourse about the distinction that represents some things as above reason, but not contrary to reason. 2. The first chapters of a discourse intitled *Greatness of mind promoted by Christianity*. The last work which he published himself, was in the spring of 1691; and is intitled, 40. *Experimenta et Observationes Physicæ*; wherein are briefly treated of several subjects relating to natural philosophy in an experimental way. To which is added a small collection of strange reports. 8vo.

About the entrance of the summer, he began to feel such an alteration in his health as induced him to think of settling his affairs; and accordingly, on the 18th of July, he signed and sealed his last will, to which he afterwards added several codicils. In October, his distempers increased; and on the last day of December 1691, he departed this life, in the 65th year of his age. He was buried in St Martin's church in the Fields, Westminster, on the 7th of January following; and his funeral sermon was preached by Dr Gilbert Burnet, bishop of Salisbury. The bishop made choice upon this occasion of a text very apposite to the subject; namely, "For God giveth to a man that is good in his sight, wisdom, knowledge, and joy *." After explaining the meaning of the words, he applies the doctrine to the honourable person deceased; of whom, he tells us, he was the better able to give a character from the many happy hours he had spent in conversation with him, in the course of 29 years. He gives a large account of Mr Boyle's sincere and unaffected piety; and more especially of his zeal for the Christian religion, without having any narrow notions concerning it, or mistaking, as so many do, a bigotted heat in favour of a particular sect, for that zeal which is an ornament of a true Christian. He mentions, as a proof of this, his noble foundation for lectures in defence of the gospel against

infidels of all sorts; the effects of which have been so conspicuous in the many volumes of excellent discourses which have been published in consequence of that noble and pious foundation. He was at the charge of the translation and impression of the New Testament into the Malayan tongue, which he sent over all the East Indies. He gave a noble reward to him that translated Grotius's incomparable book, "Of the truth of the Christian religion" into Arabic; and was at the charge of a whole impression, which he took care should be dispersed in all the countries where that language was understood. He was resolved to have carried on the impression of the New Testament in the Turkish language; but the company thought it became them to be the doers of it, and so suffered him only to give a large share towards it. He was at 700*l*. charge in the edition of the Irish bible, which he ordered to be distributed in Ireland; and he contributed liberally, both to the impression of the Welsh bible, and of the Erse bible for Scotland. He gave, during his life, 300*l*. to advance the design of propagating the Christian religion in America; and as soon as he heard that the East India company were entertaining propositions for the like design in the east, he sent 100*l*. for a beginning, as an example, but intended to carry it much farther when it should be set on foot to purpose.

In other respects his charities were so bountiful and extensive, that they amounted, as this prelate tells us, from his own knowledge, to upwards of 1000*l*. a year. But as our limits will not allow us to follow the bishop in the copious and eloquent account he has given of this great man's abilities, we must therefore content ourselves with adding the short eulogium by the celebrated physician, philosopher, and chemist, Dr Herman Boerhaave; who, after having declared lord Bacon to be the father of experimental philosophy, asserts, that "Mr Boyle, the ornament of his age and country, succeeded to the genius and inquiries of the great chancellor Verulam. Which (says he) of all Mr Boyle's writings shall I recommend? All of them. To him we owe the secrets of fire, air, water, animals, vegetables, fossils: so that from his works may be deduced the whole system of natural knowledge." The reader perhaps may here be pleased to know, that Mr Boyle was born the same year in which lord Bacon died.

As to the person of this great man, we are told, that he was tall, but slender; and his countenance pale and emaciated. His constitution was so tender and delicate, that he had divers sorts of cloaks to put on when he went abroad, according to the temperature of the air; and in this he governed himself by his thermometer. He escaped indeed the small-pox; but for almost forty years he laboured under such feebleness of body, and such lowness of strength and spirits, that it was astonishing how he could read, meditate, make experiments, and write, as he did. He had likewise a weakness in his eyes; which made him very tender of them, and extremely apprehensive of such distempers as might affect them. He imagined likewise, that if sickness should confine him to his bed, it might raise the pains of the stone to a degree which might be above his strength to support; so that he feared his last minutes should be too hard for him. This was the ground of all the caution and apprehension with which he was observed to live; but as to life itself, he had that just indifference for it

which

* Eccl. xi.
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which became a philosopher and a Christian. However, his sight began to grow dim not above four hours before he died; and when death came upon him, he had not been above three hours in bed, before it made an end of him with so little pain, that the flame appeared to go out merely for want of oil to maintain it.

Mr Boyle was never married; but Mr Evelyn was assured, that he courted the beautiful and ingenious daughter of Cary earl of Monmouth, and that to this passion was owing his "Seraphic Love." In the memorandum of Mr Boyle's life let down by bishop Burnet, it is remarked that he abstained from marriage, at first out of policy, afterwards more philosophically; and we find by a letter of Dr John Wallis to him, dated at Oxford, July 17th, 1669, that he had an overture made him with respect to the lady Mary Hastings, sister to the earl of Huntingdon: But it does not appear from any of his papers, that he had ever entertained the least thoughts of that kind; nay, there is a letter of his, wrote when he was young, to the lady Darrymore his niece, who had informed him of a report that he was actually married, which almost shows that he never did. The letter is written with great politeness, and in the true spirit of gallantry; and is a clear proof, that though Mr Boyle did not chuse to marry, yet it was no misanthropic cynical humour which restrained him from it. It is impossible to entertain the reader better than by presenting him with that part of it which concerns the point in question. "It is high time for me to hasten the payment of the thanks I owe your ladyship for the joy you are pleased to wish me, and of which that wish possibly gives me more than the occasion of it would. You have certainly reason, madam, to suspend your belief of a marriage, celebrated by no priest but Fame, and made unknown to the supposed bridegroom. I may possibly ere long give you a fit of the spleen upon this theme; but at present it were incongruous to blend such pure railery, as I ever prate of matrimony and amours with, among things I am so serious in as those this scribble presents you. I shall therefore only tell you, that the little gentleman and I are still at the old defiance. You have carried away too many of the perfections of your sex to leave enough in this country for reducing so stubborn a heart as mine; whose conquest were a task of so much difficulty, and so little worth it, that the latter property is always likely to deter any that hath beauty and merit enough to overcome the former. But though this untamed heart be thus insensible to the thing itself called *love*; it is yet very accessible to things very near of kin to that passion; and esteem, friendship, respect, and even admiration, are things that their proper objects fail not proportionably to exact of me, and consequently are qualities which in their highest degrees are really and constantly paid my lady Barrymore by her most obliged humble servant, and affectionate uncle, ROBERT BOYLE."

We shall conclude this account of Mr Boyle with the mention of his posthumous works, which are as follow. 1. "The general History of the air designed and begun." 2. "General heads for the natural history of a country, great or small; drawn out for the use of travellers and navigators." 3. "A paper of the honourable Robert Boyle's, deposited with the secretaries of the Royal Society, October 14th, 1680, and opened since his death; being an account of his making the

"phosphorus, September 30th, 1680." Printed in the Philosophical Transactions. 4. "An account of a way of examining waters, as to freshness or saltness." 5. "A free discourse against customary swearing, and a dissuasive from cursing," 1695, 8vo. 6. "Medicinal experiments; or a collection of choice remedies, chiefly simple and easily prepared, useful in families, and fit for the service of the country people. The third and last volume, published from the author's original manuscript; whereunto is added several useful notes explicatory of the same." 1698, 12mo. Beautiful editions of all his works have been printed at London, in 5 volumes folio, and 6 volumes 4to.

BOYLE (Charles) earl of Orrery in Ireland, and baron of Marston in the county of Somerset, was the second son of Roger the second earl of Orrery, and was born in August 1679. He was educated at Christ-church in Oxford, and soon distinguished himself by his learning and abilities. Like the first earl of Orrery, he was an author, a soldier, and a statesman. He translated the life of Lyfander from the Greek of Plutarch; and published a new edition of the epistles of Phalaris, which engaged him in a literary dispute, in which he defended the genuineness of these epistles against Dr Bentley. He was three times member for the town of Huntingdon; but his elder brother, Lionel earl of Orrery, dying on the 23d of August 1703 without issue, he succeeded to that title; and, entering into the Queen's service, had a regiment given him, when he behaved with such bravery, that in 1709 he was raised to the rank of major-general, and sworn one of her majesty's privy council. At the famous battle of the wood, he gave the strongest proofs of his intrepid courage, remaining at the head of his regiment in the warmest part of the action, till the victory was complete, which, as it was one of the most glorious, so it was the dearest bought, of any of that war. His lordship had the honour of being appointed the Queen's envoy to the states of Brabant and Flanders; and having honourably discharged that trust, was raised to the dignity of a British Peer, by the title of lord Boyle, baron of Marston, in Somersetshire. He enjoyed several other additional honours in the reign of King George I.; but having the misfortune to fall under the suspicion of the government, his lordship was committed to the tower: he was, however, at length admitted to bail; and nothing being found that could be esteemed a sufficient ground for a prosecution, he was discharged. His lordship died August 28th 1731, in the 66th year of his age. To his tutor, Mr Atterbury, he probably owed a good part of that fine relish he had for the writings of the ancients. He made these his constant study, and expressed a high contempt, says Budgell, for the greater part of our modern wits and authors. He was delighted with the company of two sorts of persons; either such as were really geniuses of the first rank, who had fine understandings, strong judgements, and true tastes; or such as had a few foibles, and an eye of ridicule in them, which served to make him laugh. He would rally these in so agreeable, and yet in so tender a manner, that, though it diverted himself and others, it was never offensive to the person rallied. The instrument which was invented by him, and bears his name, representing the solar system according to the sentiments of the new astronomers, is an undeniable

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undeniable proof of his mechanic genius. His lordship had also a turn for medicine; which led him not only to buy and read whatever was published on that subject, but also to employ his friends to fend him accounts of herbs and drugs in foreign countries.

BOYLE (John), earl of Cork and Orrery, a nobleman distinguished by his learning and genius, was the only son of Charles earl of Orrery, and was born on the 2^d of January 1707. He was educated at Christ-church college in Oxford; but, as he himself declares, early disappointments, indifferent health, and many untoward accidents, rendered him fond of retirement, and of improving his talents for polite literature and poetry; of which last art he gave several excellent specimens. He also wrote a Translation of Pliny the Younger's letters, with various notes, for the service of his eldest son the lord Boyle, in two volumes 4to. This was first published in 1751. The year following, he published the Life of Dean Swift, in several letters, addressed to his second son Hamilton Boyle; and afterwards printed Memoirs of Robert Cary earl of Monmouth, a manuscript presented to him by a relation, with explanatory notes. He died in 1762.

BOYNE, a river in Ireland, which rises in Queen's county in the province of Leinster, and runs north-east by Trim and Cavan, falling at last into the Irish channel a little below Drogheda. It is memorable for a battle fought on its banks between James II. and king William III. in which the former was defeated.

BOYSE, Boys, or Bois (John), one of the translators of the Bible in the reign of James I. was son of William Bois, rector of West Stowe, near St Edmundsbury Suffolk, and born at Nettleslead in Suffolk on the 3^d of January 1560. He was taught the first rudiments of learning by his father; and his capacity was such, that at the age of five years he read the Bible in Hebrew. He went afterwards to Hadley school; and at 14 was admitted of St John's college, Cambridge, where he distinguished himself by his skill in Greek. Happening to have the small-pox when he was elected fellow, he, to preserve his seniority, caused himself to be carried in blankets to be admitted. He applied himself for some time to the study of medicine; but, fancying himself affected with every disease he read of, he quitted that science. He was ten years chief Greek lecturer in his college, and read every day. He voluntarily read a Greek lecture for some years at four in the morning, in his own chamber, which was frequented by many of the fellows. On the death of his father, he succeeded him in the rectory of West Stowe. At the age of 36, he married the daughter of Mr Holt, rector of Boxworth in Cambridgeshire; whom he succeeded in that living, October 13th 1596. On his quitting the university, the college gave him 100l. His young wife, who was bequeathed to him with the living, which was an advowson, proving a bad economist, and he himself being wholly addicted to his studies, he soon became so much involved in debt, that he was obliged to sell his choice collection of books, consisting of almost every Greek author then extant. When a new translation of the Bible was by king James I. directed to be made, Mr Bois was elected one of the Cambridge translators. He performed not only his own, but also the part assigned to another, with great reputation; though with no profit, for he had no al-

lowance but his commons. He was also one of the six who met at Stationers Hall to revise the whole; which task they went through in nine months, having each from the company of stationers, during that time, 30s. a-week. He afterwards assisted Sir Henry Savile in publishing the works of St Chrysostom. In 1615, Dr Lancelot Andrews, bishop of Ely, bestowed on him, unasked, a prebend in his church. He died on the 14th of January 1643, in the 84th year of his age. He left a great many manuscripts behind him, particularly a Commentary on almost all the books of the New Testament.—When he was a young student at Cambridge, he received from the learned Dr Whitaker three rules for avoiding those distempers which usually attend a sedentary life, to which he adhered with equal constancy and success. The first was, To study always standing; the second, Never to study in a window; and the third, Never to go to bed with his feet cold.

BOYSE (Joseph), a late eminent dissenting minister in Dublin, much respected not only for learning and abilities, but his extensive humanity and undisssembled piety. During his ministerial charge at Dublin, he published many sermons which compose several folio volumes, a few poems, and other tracts; but what chiefly distinguished him as a writer, was the controversy he carried on with Dr King, archbishop of Dublin, and author of the *Origin of Evil*, concerning the office of a scriptural bishop. This controverted point was managed on both sides with great force of argument and calmness of temper. The bishop asserted, that the episcopal right of jurisdiction had its foundation in the New Testament: Mr Boyse, consistent with his principles, denied that any ecclesiastical superiority appeared there, with the greatest candour and good manners. He was father to

BOYSE (Samuel), the poet, a man remarkable for the fineness of his genius, the lowness of his manners, and the wretchedness of his life. He was born in 1708, and received the rudiments of his education in a private school in Dublin. When he was but 18 years old, his father, who probably intended him for the ministry, sent him to the university of Glasgow, that he might finish his education there. He had not been a year at the university, when he fell in love with the daughter of a tradesman in that city, and was imprudent enough to interrupt his education by marrying her before he had entered into his 20th year. The natural extravagance of his temper soon exposed him to want; and as he had now the additional charge of a wife, his reduced circumstances obliged him to quit the university, and go over with his wife (who also carried a sister with her) to Dublin, where they relied on the old gentleman for support. Young Boyle was of all men the furthest removed from a gentleman; he had no graces of person, and fewer still of conversation. Never were three people of more libertine characters than young Boyle, his wife, and sister-in-law; yet the two ladies wore such a mask of decency before the old gentleman, that his fondness was never abated. The estate his father possessed in Yorkshire was sold to discharge his debts; and when the old man lay in his last sickness, he was entirely supported by presents from his congregation, and buried at their expence. We have no further account of Mr Boyle, till we find him soon after his father's death at Edinburgh. At this place his poetical genius raised

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him many friends, and some patrons of very great eminence. He published a volume of poems in 1731, to which is subjoined *The Tablature of Cebes*, and *A letter upon liberty*, inserted in the *Dublin journal* 1726; and by these he obtained a very great reputation. They are addressed to the countess of Eglinton. This amiable lady was the patroness of all men of wit, and very much distinguished Mr Boyle while he resided in that country. Upon the death of the viscountess Stormont, Mr Boyle wrote an elegy, which was very much applauded by her ladyship's relations. This elegy he intitled *The tears of the muses*, as the deceased lady was a woman of the most refined taste in the sciences, and a great admirer of poetry. The lord Stormont was so much pleased with this mark of esteem paid to the memory of his lady, that he ordered a very handsome present to be given to Mr Boyle by his attorney at Edinburgh. The notice which lady Eglinton and the lord Stormont took of our poet, recommended him likewise to the patronage of the duchess of Gordon, who was so solicitous to raise him above necessity, that she employed her interest in procuring the promise of a place for him. She gave him a letter, which he was next day to deliver to one of the commissioners of the customs at Edinburgh. It happened that he was then some miles distant from the city; and the morning on which he was to have rode to town with her Grace's letter of recommendation proved to be rainy. This slender circumstance was enough to discourage Boyle, who never looked beyond the present moment: he declined going to town on account of the rainy weather; and while he let slip the opportunity, the place was bestowed upon another, which the commissioner declared he kept for some time vacant, in expectation of seeing a person recommended by the duchess of Gordon. Boyle at last, having defeated all the kind intentions of his patrons towards him, fell into contempt and poverty, which obliged him to quit Edinburgh. He communicated his design of going to London to the duchess of Gordon; who, having still a very high opinion of his poetical abilities, gave him a letter of recommendation to Mr Pope, and obtained another for him to Sir Peter King the lord chancellor of England. Lord Stormont recommended him to the solicitor-general his brother, and many other persons of the first fashion. Upon receiving these letters, he, with great caution, quitted Edinburgh, regretted by none but his creditors. Upon his arrival in London, he went to Twickenham, in order to deliver the duchess of Gordon's letter to Mr Pope; but that gentleman not being at home, Mr Boyle never gave himself the trouble to repeat his visit. He wrote poems; but those, though excellent in their kind, were lost to the world, by being introduced with no advantage. He had so strong a propensity to groveling, that his acquaintance were generally of such a cast as could be of no service to him; and those in higher life he addressed by letters, not having sufficient confidence or politeness to converse familiarly with them. Thus unfit to support himself in the world, he was exposed to variety of distresses, from which he could invent no means of extricating himself but by writing mendicant letters. It will appear amazing, that this man, of so abject a spirit, was voluptuous and luxurious: he had no taste for any thing elegant, and yet was to the last degree expensive. Can it be believed, that often when he had

Boyle.

received but a guinea, in consequence of a supplicating letter, he would go into a tavern, order a supper to be prepared, drink of the richest wines, and spend all the money that had just been given him in charity, without having any one to participate the regale with him, and while his wife and child were starving at home?

It was about the year 1740, that Mr Boyle, reduced to the last extremity of human wretchedness, had not a shirt, a coat, or any kind of apparel, to put on; the sheets in which he lay were carried to the pawnbroker's, and he was obliged to be confined to his bed with no other covering than a blanket. He had little support but what he got by writing letters to his friends in the most abject style; but was perhaps ashamed to let this instance of his distress be known, which probably was the occasion of his remaining six weeks in that situation. During this time he had some employment in writing verses for the Magazines; and whoever had seen him in his study, must have thought the object singular enough: he sat up in bed with the blanket wrapt about him, through which he had cut a hole large enough to admit his arm, and, placing the paper upon his knee, scribbled in the best manner he could the verses he was obliged to make: whatever he got by those, or any other of his begging letters, was but just sufficient for the preservation of life. And perhaps he would have remained much longer in this distressful state, had not a compassionate gentleman, upon hearing this circumstance related, ordered his clothes to be taken out of pawn, and enabled him to appear again abroad.

About the year 1745, Mr Boyle's wife died. He was then at Reading, and pretended much concern when he heard of her death. His business at Reading was to compile a Review of the most material transactions at home and abroad during the last war: in which he has included a short account of the late rebellion. Upon his return from Reading, his behaviour was more decent than it had ever been before; and there were some hopes that a reformation, though late, would be wrought upon him. He was employed by a bookseller to translate *Fenelon on the existence of God*; during which time he married a second wife, a woman in low circumstances, but well enough adapted to his taste. He began now to live with more regard to his character, and supported a better appearance than usual; but while his circumstances were mending, and his irregular appetites losing ground, his health wisely declined. He had the satisfaction, while in this lingering illness, to observe a poem of his, intitled *The Deity*, recommended by two eminent writers, the ingenious Mr Fielding, and the reverend Mr James Hervey author of *The Meditations*.

Mr Boyle's mind was often religiously disposed; he frequently talked upon that subject, and probably suffered a great deal from the remembrance of his conscience. The early impressions of his good education were never entirely obliterated; and his whole life was a continued struggle between his will and reason, as he was always violating his duty to the one, while he felt under the subjection of the other. It was in consequence of this war in his mind, that he wrote a beautiful poem called *The Recantation*. In May 1749, he died in obscure lodgings near Shoe-lane; but in sentiments, there is the greatest reason to believe, very different from those

in

Boysfe
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Brasheum.

in which he had spent the greatest part of his life. An old acquaintance of his endeavoured to collect money to defray the expences of his funeral, so that the scandal of being buried by the parish might be avoided; but in vain; the remains of this son of the muses were, with very little ceremony, hurried away by the parish-officers.

Never was a life spent with less grace than that of Mr Boysfe, and never were such distinguished abilities given to less purpose. His genius was not confined to poetry only: he had a taste for painting, music, and heraldry; with the latter of which he was very well acquainted. His poetical pieces, if collected, would make fix moderate volumes. Many of them are scattered in *The Gentleman's Magazine*, marked with the letter T, and *Aleus*. Two volumes were published in London. An ode of his in the manner of Spenser, intitled *The Olive*, was addressed to Sir Robert Walpole, which procured him a present of ten guineas. He translated a poem from the High Dutch of Van Haren, in praise of peace, upon the conclusion of that made at Aix la Chapelle; but the poem which procured him the greatest reputation was that upon the attributes of the Deity. He was employed by Mr Ogle to translate some of Chaucer's tales into modern English, which he performed with great spirit, and received at the rate of three pence a line for his trouble. Mr Ogle published a complete edition of that old poet's *Canterbury Tales* modernized; and Mr Boysfe's name is put to such tales as were done by him. In 1743, Mr Boysfe published, without his name, an ode on the battle of Dettingen, intitled *Albion's Triumph*.

BOZOLO, a town of Italy, in the duchy of Mantua, capital of a territory of the same name, and subject to the house of Austria. E. Long. 10. 25. N. Lat. 45. 9.

B QUADRO, **QUADRATO**, or *Durale*, in music, called by the French *b quarre*, from its figure \square . This is what we call *B natural* or *sharp*, in distinction to *B mol* or *flat*. See **FLAT**, and **SHARP**.

If the flat \flat be placed before a note in the thorough bass, it intimates, that its third is to be minor; and if placed with any cypher over a note in the bass, as $\flat 6$, or $\flat 5$, &c. it denotes, that the fifth or sixth thereto are to be flat. But if the quadro \square be placed over any note, or with a cypher, in the thorough bass, it has the contrary effect; for thereby the note or interval thereto is raised to its natural order.

BRABANT, a large province of the Netherlands, with the title of a duchy. It is bounded on the north by the province of Holland and the duchy of Guelderland; on the east, by the same duchy and the bishopric of Liege; on the south, by the province of Namur and Hainhalt; and on the west, by Zealand. It is divided into Dutch Brabant and Austrian Brabant; watered by several rivers, of which the Scheldt, the Ruppel, and the Dommel, are the chief. The soil is very fertile; and it contains 26 fortified towns, of which Brussels is the capital.

BRABEJUM, the **AFRICAN ALMOND**; a genus of the monogynia order, belonging to the tetrandria class of plants. Of this genus there is but one species, viz. the stellatifolium, which is a native of the Cape of Good Hope. In Europe it seldom grows above eight or nine feet high, but in its native soil is a tree of a middling

Brabeutes
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Bracelet.

growth. It rises with an upright stem, which is soft, and full of pith within, and covered with a brown bark. The leaves come out all round the branches at each joint: they are indented at their edges, standing on very short foot-stalks. The flowers are produced towards the end of their shoots, which are of a pale colour inclining to white. This may be propagated, though with difficulty, by layers made in April; but they are often two years before they produce roots strong enough to be taken from the plants. When the branches are laid down, it will be proper to fit them at the point (as is practised in laying carnations), which will promote their taking root. In winter, the plants should have a good greenhouse; but in summer they should be placed abroad in a sheltered situation.

BRABEUTES, or **BRABEUTA**, in antiquity, an officer among the Greeks, who presided at the public games, and decided controversies that happened among the antagonists in the gymnastical exercises. The number of brabeute was not fixed; sometimes there was only one, but more commonly they amounted to nine or ten.

BRACCIANO, a town of St Peter's patrimony, about 12 miles north of Rome, situated on the west side of a lake to which it gives name. E. Long. 13°. N. Lat. 42°.

BRACCIALINI (Francis), an Italian poet, a native of Politoia, and the friend of Pope Urban VIII. died about the year 1644, aged 80. He wrote, 1. An epic poem, intitled, *The Crofs reconquered*, under the emperor Heraclius. 2. An heroic poem, intitled, *The mockery of the Pagan gods*. 3. The election of Pope Urban VIII. in 23 books.

BRACE is commonly taken for a couple or pair, and applied by huntmen to several beasts of game, as a brace of bucks, foxes, hares, &c.

BRACE, or *Brasse*, is also a foreign measure, answering to our fathom. See **FATHOM**.

BRACE, in architecture, a piece of timber framed in with bevil joints, the use of which is to keep the building from swerving either way. When the brace is framed into the kingleses or principal rafters, it is by some called a *strut*.

BRACE, in writing or printing, a crooked line inclosing a passage, as in a triplet.

BRACES, in the sea-language, are ropes belonging to all the yards of a ship, except the mizen, two to each yard, reeved through blocks that are fastened to pennants, seized to the yard-arms. Their use is either to square or traverse the yards. Hence to brace the yard, is to bring it to either side. All braces come astward on; as, the main brace comes to the poop, the main-top-fail brace comes to the mizen-top and thence to the main shrouds, the fore and fore-top-fail braces come down by the main and main-top-fail stays, and so of the rest. But the mizen-bowline serves to brace to the yard, and the cross-jack braces are brought forwards to the main shrouds, when the ship sails clove by a wind.

BRACES of a Coach, thick straps of leather on which it hangs.

BRACELET, an ornament worn on the wrist, much used among the ancients: it was made of different materials, and in different fashions, according to the age and quality of the wearer.

Brachæus
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Brachyp-
renia.

Bracelets are still worn by the savages of Africa, who are so excessively fond of them, as to give the richest commodities, and even their fathers, wives, and children, in exchange for those made of no richer materials than shells, glass-beads, and the like.

BRACHLÆUS, the name of a muscle. See ANATOMY, *Table of the Muscles*.

Coraco-BRACHIALIS. See ANATOMY, *ibid*.

BRACHIUM, or ARM. See ANATOMY, n° 48, &c.

BRACHMINS, or BRACHMANS, a branch of the ancient Gymnosophists, or philosophers of India, remarkable for the severity of their lives and manners. See the article GYMNO SOPHISTS.

Some say they derive their name from the patriarch Abraham, whom they call in their language *Brachma*, or *Brama*. Others deduce it from the name of their god *Brachma*; which some again take to be the same with Abraham; whence Pottel calls them *Abrahamites*. F. Thomassin derives the word from the Hebrew *barach*, to fly or escape; because the Brachmans retire into the country and live in deserts. The same author gives us another derivation, viz. from the Hebrew *barach*, (*benedicere, orare*), to bless or pray; in regard this is their principal occupation.—The Greeks ascribe to them the doctrine of the immortality of the soul, and certain notions concerning the nature of the Supreme Being, and future rewards and punishments. To this species of knowledge the Brachmans added an infinite number of religious observances, which were adopted by Pythagoras in his school; such as fasting, prayer, silence, and contemplation. They were looked upon as the friends of the gods, because they affected to pay them so much regard; and as the protectors of mankind, because they paid them no regard at all. No bounds were therefore set to the respect and gratitude that were shewn them: princes themselves did not scruple to consult these recluses upon any critical conjuncture, from a supposition, no doubt, that they were inspired; since it was impossible to imagine that they had the advantages of experience. We can scarcely, however, deny, that there might be among them some men of real virtue, whose minds relished the pure and ingenious delights of study and science; and who, by nobly raising their thoughts to the contemplation of the First Being, must have had more powerful incitements to render themselves worthy of his care, and none to justify them in deceiving and tyrannizing over their fellow-creatures.

There appear still some remains of the ancient brachmans in the east, under the denomination of Bramins †. BRACHYGRAPHY, the art of short-hand writing. See SHORT-HAND.

BRACHYLOGY, *ἑραχολογία*, in rhetoric, the expressing any thing in the most concise manner. This, as far as is consistent with perspicuity, is a beauty and virtue of the style; but if obscurity be the consequence, which is often the case, it becomes a blemish, and inexcusable defect. Quintilian gives us an instance of brachylogy from Sallust: *Mithridates corpore ingenti perinde armatus*; “Mithridates armed, as it were, with the hugeness of his stature.” See BREVITY.

BRACHYPTERA, a term used by Willoughby, to denote those hawks which have their wings so short, as not to reach to the end of the tail: Of this kind are the goshawk, sparrowhawk, &c.

BRACHYPYRENIA, in the history of fossils, a

genus of septaria, with a short roundish nucleus *.

BRACHYTELOSTYLA, in natural history, the name by which Dr Hill calls those crystals which are composed of a short hexangular column terminated at each end by an hexangular pyramid. See CRYSTAL.

BRACKET, among carpenters, &c. a kind of wooden stay, serving to support shelves, and the like.

BRACKETS, in a ship, the small keels, serving to support the galleries, and commonly carved. Also the timbers that support the gratings in the head, are called brackets.

BRACKETS, in gunnery, are the checks of the carriage of a mortar: they are made of strong planks of wood, of almost a semicircular figure, and bound round with thick iron plates; they are fixed to the beds by four bolts, which are called bed-bolts; they rise up on each side of the mortar, and serve to keep her at any elevation, by means of some strong iron bolts, called *bracket-bolts*, which go through these checks or brackets.

BRACKLAU, a strong town in Poland, capital of a palatinate of the same name. The houses are built of wood. It was taken by the Turks in 1672, but retaken three years afterwards. It is seated on the river Bog, in E. Long. 29. 20. N. Lat. 48. 5.

BRACKLAW, a palatinate of that name, which is the eastern part of Podolia; it is also called Lower Podolia, and is of greater extent than Upper Podolia, but is more desolate, on account of the neighbourhood of the Tartars.

BRACKLEY, a borough-town in Northamptonshire, in England, seated on the edge of the county, next Buckinghamshire, on a branch of the river Ouse. It is an ancient and large corporation-town, containing two parish-churches; is governed by a mayor and aldermen; and sends two members to parliament. It had formerly a college, which is turned into a free school. W. Long. 1. 15. N. Lat. 52. 0.

BRACTEA, in natural history, denotes a spangle, or thin flake of any substance.

BRACTEA, in botany, a thin leaf or plate of any *folium florale*, ranged by Linæus among the *fulcra* of plants. These floral leaves differ in shape and colour from the other *folia* of the plant; are generally situated on the pedunculus, and often so near the corolla as to be easily mistaken for the *calix*; than which, however, the *bractæe* are generally more permanent. Examples of the floral leaves are seen in the tilia, fumaria bulbosa, lavendula, and hornimund. See p. 1297. n° 127.

BRACTEARIA, in natural history, a genus of tales, composed of small plates in form of spangles, each plate either being very thin, or siffle into very thin ones.

Of this genus there are a great many species, called, from their different colours, *mica aurea*, or gold-glimmer; and *mica argentea*, silver-glimmer, or catsilver, &c.

BRACTON (Hemy), lord chief justice of England in the reign of Henry III. was probably a native of Devonshire. He was educated at Oxford, where he took the degree of doctor of laws, and was made one of the itinerant judges about the year 1244. Ten years after, he became chief justice, and had the earl of Derby's house in London assigned him for his town residence, during the minority of that nobleman. He

Brachytelo-
styla
||
Bracton.

* See Septaria.

† See Brachmanis.

Brad
Bradford

is said to have filled this important office with singular reputation during 20 years. When he died is not known; probably it was in the reign of Edward I. He wrote *De legibus et consuetudinibus Anglie*, which is one of the most ancient, and also most methodical books on our laws. His method is copied from Justinian. This work was printed at London in 1569, folio; and in 1640, 4^{to}. The first is very incorrect.

BRAD, a town of Sclavonia, seated on the north side of the river Save, in E. Long. 18. 40. N. Lat. 45. 20.

BRADFIELD, a town of Essex in England, in E. Long. 0. 30. N. Lat. 51. 14.

BRADFORD, a town of Wiltshire in England, seated in W. Long. 2. 40. N. Lat. 51. 20.

BRADFORD (John), a divine, and martyr to the reformation, was born in the former part of the reign of Henry VIII. at Manchester in Lancashire. Being a remarkable penman and accountant, he became secretary to Sir John Harington, who was several times employed by king Henry, and his successor Edward VI. as paymaster to the troops abroad. Bradford at this time was a gay man, and to support his extravagance made free with the king's money; but being at last unable to support the reflection of his guilt, he determined to make restitution, and actually repaid the money. Quitting his employment of secretary, about the year 1547, he took chambers in the inner temple, and for some time studied the law; but finding in himself an inclination to preach the gospel, in the following year he removed to Catherine-hall in Cambridge, where he applied with such uncommon assiduity to the study of divinity, that in a much shorter time than usual he was admitted to the degree of master of arts, and soon after made fellow of Pembroke-hall. Bishop Ridley, who, in 1550, was translated to the see of London, charmed with Bradford's application and zeal, now sent for him to the metropolis, ordained, and appointed him his chaplain. In 1553, he was also made chaplain to Edward VI. during which time he became one of the most popular preachers in the kingdom. Such a reformer was too dangerous to be suffered in the succeeding reign. Mary was hardly in possession of the crown, before Bradford's persecutions began. He was first confined in the tower for sedition, where he continued a year and an half; during which time he wrote several epistles that were dispersed in various parts of the kingdom. He was afterwards removed to other prisons, and at last brought to his trial before that infernal court of inquisition in which Gardiner sat as chief inquisitor, where he defended his principles to the last, in contempt of their utmost power. They condemned him to the flames; and he was accordingly burnt alive in Smithfield, on July 1. 1555. His works are, 1. Seventy-two letters, written to various people, whilst the author was in prison; printed in bishop Coverdale's collection. 2. Ten letters, printed in Fox's acts and monuments. 3. Complaint of verity, 1559, 8vo. 4. Three examinations before the commissioners, and his private talk with the priests, with the original of his life, 1561, octavo. 5. Two notable sermons, 1574, octavo, 1631. 6. Godly meditations and prayers, 1614, 24^{to}. 7. Treatise of repentance, 1622. With several translations and other pieces.

BRADFORTH, a town in the west of Yorkshire,

seated on a branch of the river Aire, in W. Long. 1. 35. N. Lat. 53. 40. Bradley.

BRADLEY (Dr James), a famous English astronomer, was the third son of William and Jane Bradley, and was born at Sherborne in Dorsetshire in the year 1692.

He was fitted for the university at North Leach by Mr Egles, and Mr Brice, who kept a boarding school there; and from North Leach he was sent to Oxford.

His friends intended him for the church, and his studies were regulated with that view; and as soon as he was of sufficient age to receive holy orders, the bishop of Hereford, who had conceived a great esteem for him, gave him the living of Bridftow, and soon after he was inducted to that of Welfrie in Pembroke-shire. But notwithstanding these advantages, from which he might promise himself still farther advancement in the church, he at length resigned his livings, that he might be wholly at liberty to pursue his favourite study the mathematics, and particularly astronomy.

He was nephew to Mr Pound, a gentleman who is well known in the learned world by many excellent observations, and who would have enriched it with more, if the journals of his voyages had not been burnt at Pulo Condor, when the place was set on fire, and the English who were settled there cruelly massacred, Mr Pound himself very narrowly escaping with his life. With this gentleman, Mr Bradley passed all the time that he could spare from the duties of his function; and perhaps he sometimes trespassed upon them: he was then sufficiently acquainted with the mathematics to improve by Mr Pound's conversation; yet it does not appear that, in this study, he had any preceptor but his genius, or any assistant but his labour.

It may be easily imagined, that the example and conversation of Mr Pound did not render Bradley more fond of his profession than he was before; he continued, however, as yet to fulfil the duties of it, though at this time he had made such observations as laid the foundation of those discoveries which afterwards distinguished him as one of the greatest astronomers of his age.

Though these observations were made as it were by stealth, they gained him at first the notice, and then the friendship, of the lord chancellor Macclesfield, Mr Newton afterwards Sir Isaac, Mr Halley, and many other members of the royal society, into which he was soon elected a member.

About the same time, the chair of Savilian professor of astronomy became vacant by the death of the celebrated Dr Keil; and Mr Bradley was elected to succeed him on the 31st of October 1721, being then just 29 years old; and his colleague was Mr Halley, who was professor of geometry on the same foundation.

Bradley, upon his being elected into this professorship, gave up both his livings, and with great joy quitted a situation in which his duty was directly opposite to his inclination.

From this time, he applied himself wholly to the study of his favourite science; and in the year 1727 he published his theory of the aberration of the fixed stars, which is allowed to be one of the most useful and ingenious discoveries of modern astronomy.

Three years after this discovery, by which Mr Bradley

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Bradley. ley acquired very great reputation, he was appointed lecturer in astronomy and physics, at the museum at Oxford.

He pursued his studies with equal application and delight; and in the course of his observations, which were innumerable, he discovered that the inclination of the earth's axis upon the plane of the ecliptic was not always the same, but that it varied backwards and forwards some seconds, and that the period of these variations was nine years. This period seemed altogether unaccountable, as it could not be supposed to have any thing in common with the revolution of the earth, which is performed in one year. Mr Bradley, however, discovered the cause of this phenomenon in the Newtonian system of attraction.

He published this discovery in 1737, so that in the space of about ten years he communicated to the world two of the finest discoveries in modern astronomy, which will for ever make a memorable epocha in the history of that science.

Mr Bradley always preserved the esteem and friendship of Mr Halley; who, being worn out by age and infirmities, thought he could do nothing farther for the service of astronomy, than procure for Mr Bradley the place of regius professor of astronomy at Greenwich, which he had possessed himself many years with the greatest reputation. With this view, he wrote many letters, which have been since found among Mr Bradley's papers, desiring his permission to apply for a grant of the reversion of it to him, and even offering to resign in his favour, if it should be thought necessary; but before Mr Halley could bring this kind project to bear, he died. Mr Bradley, however, obtained the place afterwards, by the favour and interest of my lord Macclesfield, who was afterwards president of the royal society.

As soon as the appointment of Mr Bradley to this place was known, the university of Oxford sent him a diploma creating him doctor of divinity.

The appointment of astronomer at Greenwich placed Mr Bradley in his proper element, and he pursued his observations with unwearied diligence.

However numerous the collection of astronomical instruments at the observatory at Greenwich, it was impossible that such an observer as Dr Bradley should not desire to increase them, as well to answer those particular views, as in general to make observations with greater exactness. In the year 1748, therefore, he took the opportunity of the annual visit made by the royal society to the observatory, in order to examine the instruments and receive the professor's observations for the year, to represent so strongly the necessity of repairing the old instruments, and purchasing new, that the society thought proper to consent to it to his majesty, and his majesty gave them 1000*l.* for that purpose. This sum was laid out under the direction of Dr Bradley, who, with the assistance of the late celebrated Mr Graham and Mr Bird, furnished the observatory with as complete a collection of astronomical instruments, as the most skilful and diligent observer could desire.

Dr Bradley, furnished with such assistance, pursued his observations with new assiduity, an incredible number of which were found after his death, and put into the hands of the royal society.

It has been already observed, that when Dr Bradley was elected to the professor's chair at Oxford, he gave up his two livings, which were at such a distance, that he could not possibly fulfil the duties of them himself; but it happened that after he was settled at Greenwich, the living of that parish became vacant, which is very considerable, and which was offered to him, as he was upon the spot to perform the duty, and had the claim of uncommon merit to the reward. This living, however, Dr Bradley, very greatly to his honour, refused, fearing the duties of the astronomer would too much interfere with those of the divine. His majesty, however, hearing of the refusal, was so pleased with it, that he granted him a pension of 250*l.* a year in consideration of his great abilities and knowledge in astronomy and other branches of the mathematics, which had procured so much advantage to the commerce and navigation of Great Britain, as is particularly mentioned in the grant which is dated the 15th of February 1752.

Dr Bradley, about the same time, was admitted into the council of the royal society. In the year 1748, he was admitted a member of the royal academy of sciences and belles lettres of Berlin, upon the death of Mr Crevier, first physician to his catholic majesty; in the year 1752, a member of the imperial academy at Peterburgh; and in 1757, of that instituted at Bologna.

Dr Bradley was still indefatigable in his observations, and whatever honour he received became an incitement to obtain new distinction; his corporal abilities, however, at length declined, though his intellectual suffered no abatement. In the year 1760, he became extremely weak and infirm; and towards the end of June 1762, he was attacked with a total suppression of urine, caused by an inflammation of the reins, which on the 12th of July following put an end to his life, in the 70th year of his age. He was buried at Mitcham-Hampton in Gloucestershire, in the same grave with his mother and his wife.

In the year 1744, he married Susannah Peach, the daughter of a gentleman of that name in Gloucestershire, by whom he had only one daughter, now living.

As to his character, he was remarkable for a placid and gentle modesty, very uncommon in persons of an active temper and robust constitution. It was still more remarkable, that, with this untroubled equanimity of temper, he was compassionate and liberal in the highest degree. Although he was a good speaker, and possessed the rare but happy art of expressing his ideas with the utmost precision and perspicuity, yet no man was a greater lover of silence, for he never spoke but when he thought it absolutely necessary. He did indeed think it necessary to speak when he had a fair opportunity to communicate any useful knowledge in his own way; and he encouraged those that attended his lectures to ask him questions, by the exactness with which he answered, and the care he took to adapt himself to every capacity.

He was not more inclined to write than to speak, for he has published very little: he had a natural diffidence, which made him always afraid that his works should injure his character; and therefore suppressed many, which probably were well worthy of the public attention. He was even known, as it were, in spite of himself; and, in spite of himself, he was known much,

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much, and consequently much esteemed. He was acquainted with many of the first persons in this kingdom, persons eminent as well for their rank as their abilities: he was honoured by all men of learning in general; and there was not an astronomer of any eminence in the world, with whom he had not a literary correspondence.

Upon the whole, it may be said of Dr Bradley, that no man cultivated great talents with more success, or had a better claim to be ranked among the greatest astronomers of his age.

BRADNINCH, a town of Devonshire, once a considerable place, but some time ago totally destroyed by fire. W. Long. 3. 35. N. Lat. 50. 45.

BRADS, among artificers, a kind of nails used in building, which have no spreading heads as other nails have. They are distinguished by iron-mongers, by fix names; as, joiner's-brads, flooring-brads, batten-brads, bill-brads, or quarter-heads, &c. Joiner's-brads are for hard waincot, batten-brads are for soft waincot; bill-brads are used when a floor is laid in haste, or for shallow joists subject to warp. See NAIL.

BRADSHAW (Henry), a Benedictine monk, was born at Chester, about the middle of the 15th century. Discovering an early propensity to religion and literature, he was received while a boy into the monastery of St Werberg in that city; and having there imbibed the rudiments of his education, he was afterwards sent to Gloucester college, in the suburbs of Oxford, where for a time he studied theology with the novices of his order, and then returned to his convent at Chester; here, in the latter part of his life, he applied himself chiefly to the study of history, and wrote several books. He died in the year 1513, the fifth of Henry VIII. His poetry is not inferior to that of any of his contemporaries. His works are, 1. *De antiquitate et magnificientia urbis Cestrie*. 2. *Chronicon*. 3. The life of the glorious virgin of St Werberg. Printed Lond. 1521, 4to, in verse. The life of St Werberg makes only part of this work; for it contains also a description of the kingdom of Mercia, life of St Etheldred, the life of St Sexburg, the foundation and history of Chester, and the chronicles of some kings. Possibly this work may include the two first. Bishop Tanner says, that he wrote a chronicle in English verse, extracted from Bede, Malmsbury, Geraldus, and others. Probably this is the chronicle abovementioned.

BRADWARDIN (Thomas), archbishop of Canterbury, was born at Hartfield in Sussex, about the close of the 13th century. He was educated at Merton College, Oxford, where he took the degree of doctor of divinity; and acquired the reputation of a profound scholar, a skilful mathematician, and consummate divine. Authors are not agreed as to his first preferments. Pits says he was professor of divinity at Oxford. They agree, however, in asserting that from being chancellor of the diocese of London, he became a courtier and confessor to Edward III. whom he constantly attended during his war with France, assisting that victorious prince with his advice, animating the troops, and fervently praying for their success. After his return from the war, he was made prebendary of Lincoln, and afterwards archbishop of Canterbury. He died at Lambeth in the year 1349, forty days after his consecration; and was buried in St Anselm's chapel, near

the fourth wall. His works are, 1. *De causis Dei*, printed London, 1618, published by J. H. Savil. 2. *De geometria speculativa*, &c. Paris, 1495, 1512, 1530. 3. *De arithmetica practica*, Paris, 1502, 1512. 4. *De proportionibus*, Paris, 1495. Venice, 1505, folio. 5. *De quadratura circuli*, Paris, 1495, folio.

BRADY (Robert), born in Norfolk in 1643, was master of Caius college, Cambridge, regius professor there, and twice representative of that university in parliament. In 1685, he was made keeper of the records in the tower, and was physician in ordinary to James II. He wrote, An introduction to the Old English history; An history of England from the time of the Romans, to the end of the reign of Richard II.; and, A treatise on English boroughs. He died in 1700.

BRADY (Nicholas), an excellent divine and poet, born at Bandon, in the county of Cork, October 28th, 1659. He studied at Westminster-school, and afterwards at Oxford and Dublin college. He was a zealous promoter of the Revolution; and, in 1690, when the troubles broke out in Ireland, by his interest with McCarty, king James's general, he thrice prevented the burning of the town of Bandon. Having quitted several preferments in Ireland, he settled in London, where he was successively promoted to several livings; and at the time of his death was rector of Clapham, minister of Richmond, and chaplain to the duke of Ormond's troop of horse-guards. He wrote part of the new version of the Psalms, now sung in many churches in England and Ireland; the *Æneids* of Virgil, in 4 vols; and 3 vols of sermons. He died May 20th, 1726.

BRADYPUS, or SLOTH, a genus of quadrupeds belonging to the order of bruta. The characters are these: They have no fore-teeth in either jaw; the dog-teeth are blunt, solitary, and longer than the grinders; they have five grinders on each side. The body is covered with hair. There are only two species of bradypus, viz.

1. The tridactylus, or American sloth, has a short tail, and only three toes on each foot. It is about the size of a fox. The body is covered over with hair of a grey colour; the face is naked; the throat is yellowish; the fore-feet are longer than the hind-feet; the claws, which are three on each foot, are compressed, and very strong; and they have no mammae on the breast; they have no external ears, but only two winding holes. It is the most sluggish and most slow of all animals, and seems to move with the utmost pain. Its food is fruit, or the leaves of trees. If it cannot find fruit on the ground, it looks out for a tree well loaded, and with great pain climbs up: to save the trouble of descending, it flings off the fruit; and, forming itself into a ball, drops from the branches, continues at the foot till it has devoured all, nor ever stirs till compelled by hunger. It never drinks, and is terrified at rain.*

The following wonderful account of this animal, from Kircher's *Musurgia*, is quoted by Mr Stillingfleet in his miscellaneous tracts. "The description (says Kircher) I had from father Torus, who resided in America, who had animals of this kind in his possession, and made many experiments in relation to their nature and qualities. Its figure is extraordinary; it is about the bigness of a cat, of very ugly countenance, and has claws extended like fingers. The hinder part of the head and neck are covered with hair. It sweeps the ground

Brady,
Bradypus.

* See Plate
LXVIII.
fig. 1.

Bradypus
Brag.

Braga
Brahe.

ground with its fat belly, never rises upon its feet, and moves so slowly, that it would scarce go the length of a bow-shot in 15 days, though constantly moving, and it is therefore called the *sloth*. It lives generally upon tops of trees, and employs two days to crawl up, and as many to get down again. Nature has doubly guarded this animal against its enemies. First, by giving it such strength in its feet, that whatever it seizes, it holds so fast, that it never can be freed from its claws, but must there die of hunger. Secondly, in giving it such a moving aspect, when it looks at any man who should be tempted to hurt it, that it is impossible not to be touched with compassion; besides, that at the same time it sheds tears, and upon the whole persuades one, that a creature so defenceless, and of so unhappy a body, ought not to be tormented. To make an experiment of this, the abovementioned father procured one of these animals to be brought to our college at Carthagena. He put a long pole under its feet, which it seized upon very firmly, and would not let go again. The animal therefore thus voluntarily suspended was placed between two beams along with the pole, and there it remained without meat, drink, or sleep, 40 days; its eyes being always fixed on people that looked at it, who were so touched, that they could not forbear pitying it. At last being taken down, they let loose a dog on it, which after a little while the sloth seized with his feet, and held him four days, till he died of hunger. This was taken from the mouth of the father. They add, (continues Kircher), that this creature makes no noise but at night, but that very extraordinary. For by interruptions, that last about the length of a sigh or semipauls, it goes through the six vulgar intervals of music Ut, re, mi, fa, sol, la, La, sol, fa, mi, re, ut, ascending and descending, and these perfectly in tune. So that the Spaniards, when they first got possession of this coast, and heard these notes, they imagined that some people brought up to our music were singing. This animal is called by the natives *baut*; certainly because, going through these musical intervals, it repeats Ha, ha, ha, ha, ha, &c." To this account Linnaeus seems, in his *Systema Naturæ*, to give credit. For he says, in his short way of description, among other things, "It utters an ascending hexachord: its noise is horrible; its tears are piteous." He quotes Musgrave, Chisius, Gesner, &c.

2. The didactylus has two toes on each foot, and no tail: The head is round; the ears are large; and it has two mammae on the breast: The body is covered with ash-coloured hair. It is a native of Ceylon.

BRAE-MAR, a mountainous territory of Scotland, in the shire of Aberdeen, where the last earl of Mar began to raise a rebellion in 1715. It is 27 miles north-west of Aberdeen.

BRAE-Murray, a mountainous and woody tract of land, lying in the shires of Elgin and Nairn in Scotland.

BRAG, an ingenious and pleasant game at cards, where as many may partake as the cards will supply; the eldest hand dealing three to each person at one time, and turning up the last card all round. This done, each gamster puts down three flakes, one for each card.—The first flake is won by the best card turned up in the dealing round; beginning from the ace, king, queen, knave, and so downwards. When cards of the

same value are turned up to two or more of the gamsters, the eldest hand gains; but it is to be observed, that the ace of diamonds wins, to whatever hand it be turned up.—The second flake is won by what is called the *brag*, which consists in one of the gamsters challenging the rest to produce cards equal to his: Now it is to be observed, that a pair of aces is the best brag, a pair of kings the next, and so on; and a pair of any fort wins the flake from the most valuable single card. In this part consists the great diversion of the game; for, by the artful management of the looks, gestures, and voice, it frequently happens, that a pair of fives, treys, or even duces, out-brags a much higher pair, and even some pairs royal, to the no small merriment of the company. The knave of clubs is here a principal favourite, making a pair with any other card in hand, and with any other two cards a pair royal.—The third flake is won by the person who first makes up the cards in his hand one and thirty; each dignified card going for ten, and drawing from the pack, as usual in this game.

BRAGA, the capital of the province of Entre-minhoduero, in Portugal, situated on the river Cavado, in W. Long. 8. 40. N. Lat. 41. 20.

BRAGANZA, a city of Portugal, and capital of a duchy of the same name. It is seated on an eminence, by a brook called *Fervença*; and is divided into two parts, the old city, and the town. The former is upon an eminence, and fortified with a double wall. That part next the town has five bastions, but no ditch; the citadel is on the opposite side joined to the wall. The town is in a plain, and defended by a fort with four bastions. It is seated near the river Sabor on the frontiers of Galicia, in W. Long. 6. 15. N. Lat. 41. 27.

BRAGGET, a kind of drink made of malt, honey, and spices, much used in Wales.

BRAHE (Tycho), a celebrated astronomer, descended of an illustrious family originally of Sweden but settled at Denmark, was born December 14th 1546, at Knudstorp in the county of Schonen. He was taught Latin when seven years old, and studied five years under private tutors. His father dying, his uncle sent him, in April 1559, to study philosophy and rhetoric at Copenhagen. The great eclipse of the sun on the 21st of August 1560, happening at the precise time the astronomers had foretold, he began to look upon astronomy as something divine; and purchasing the tables of Stadius, gained some notion of the theory of the planets. In 1562, he was sent by his uncle to Leipsic to study law; but astronomy wholly engrossed his thoughts, and in purchasing books on that science he employed all his pocket-money. Having procured a small celestial globe, he was wont to wait till his tutor was gone to bed, in order to examine the constellations and learn their names; and when the sky was clear, he spent whole nights in viewing the stars. In 1565, a difference arising between Brahe and a Danish nobleman, they fought, and the former had part of his nose cut off; which defect he so artfully supplied with one made of gold and silver, that it was not perceivable. It was about this time that he began to apply to chemistry, proposing nothing less than to obtain the philosopher's stone. In 1571, he returned to Denmark; and was favoured by his mother's brother, Steno Belle, a lover of learning, with a convenient place at his castle

of

Brahe.

of Herritzvad near Knudtorp, for making his observations, and building a laboratory. His marrying a country girl, beneath his rank, occasioned such a violent quarrel between him and his relations, that the king was obliged to interpose to reconcile them. In 1574, by his majesty's command, he read lectures upon the theory of the comets at Copenhagen. The year following he began his travels through Germany, and proceeded as far as Venice: he then resolved to remove his family, and settle at Basil; but Frederic II. king of Denmark being informed of his design, and unwilling to lose a man that was capable of being such an ornament to his country, promised to enable him to pursue his studies, to bestow upon him for life the island of Huen in the sound, to erect an observatory and laboratory there, and to defray all the expences necessary for carrying on his designs. Tycho Brahe readily embraced this proposal; and accordingly the first stone of the observatory was laid August 8th 1576. The king also gave him a pension of 2000 crowns out of his treasury, a fee in Norway, and a canony of Roskilde, which brought him in 1000 more. James VI. of Scotland, afterwards raised to the crown of England, going to Denmark in order to marry the princess Anne, paid a visit to our author in his retirement at Uraniburg, made him several presents, and with his own hand wrote a copy of verses in his praise: but, soon after the death of king Frederic, he was deprived of his pension, fee, and canony; upon which, finding himself incapable of bearing the expences of his observatory, he went to Copenhagen, whither he brought some of his instruments, and continued his astronomical observations in that city, till Valkendorf, chamberlain to the household of Charles IV. commanded him by the king's order to discontinue them. He then removed his family to Rosstock, and afterwards to Holstein, in order to solicit Henry Ranzow to introduce him to the emperor; and that gentleman complying with his request, he was received by the emperor at Prague with the utmost civility and respect. That prince gave him a magnificent house, till he could procure one for him more fit for astronomical observations; assigned him a pension of 3000 crowns; and promised, upon the first opportunity, a fee for him and his descendants: but he did not long enjoy this happy situation; for, upon the 24th of October 1601, he died of a retention of urine, in the 55th year of his age, and was interred in a very magnificent manner in the principal church at Prague, where a noble monument was erected to him.—His skill in astronomy is universally known, and he is famed for being the inventor of a new system*, which he endeavoured, tho' without success, to establish upon the ruins of that of Copernicus. He was very credulous with regard to judicial astrology, and presages. If he met an old woman when he went out of doors, or an hare upon the road on a journey, he used to turn back immediately, being persuaded that it was a bad omen. When he lived at Uranibourg, he had at his house a madman, whom he placed at his feet at table, and fed himself. As he imagined that every thing spoken by mad persons presaged something, he carefully observed all that this man said; and because it sometimes proved true, he imagined it might always be depended on. A mere trifle put him in a passion; and against persons of the first rank, with whom it was his duty to keep on good terms, he openly

discovered his resentment. He was very apt to rally others, but highly provoked if the same liberty was taken with himself. His principal works are, 1. *Prognostica astronomica*. 2. *De mundi aetherei recentioribus phenomenis*. 3. *Epistolarum astronomicarum liber*.

BRAHMA. See BRAMA.

BRAIDALEIN, a district of Perthshire in Scotland, stretching 32 miles from east to west, and 13 where broadest from south to north; is a mountainous country, lying among the Grampian hills, supposed to be the country anciently known by the name of *Albanii*; whence the Highlanders to this day call themselves *Albinich*. It is bounded on the west by Lochaber, Lorn, and Knapdale; on the north and east, by part of Lochaber and part of Athol; and on the south, by Strathern and Montieith. It produces plenty of game and black cattle; is inhabited by Highlanders said to be the most ferocious in all Scotland; and gives the title of earl to a branch of the Campbell family, which is possessed of a noble and magnificent seat in this division. Much flax is cultivated here. Some years ago, when premia were given for the greatest crops, from 70 to 120 hogheads of lintseed were annually sown, each peck yielding two stones of drest flax; and when the yarn fold highest, 2000*l*. worth has been fold out of the country. Oats and potatoes are the other crops. Oats yield from four to six fold at the most, oftener less; bear, from eight to ten, at an average six. The corn raised seldom suffices the number of inhabitants, so they are often obliged to have recourse to importation. From their potatoes some have distilled a very strong spirit, which has been found cheaper than what is distilled from any grain. Starch is also made from them; and, in some places, bread. Corcur, or the lichen omphaloides, is an article of commerce; great quantities have been scraped from the rocks, and exported for the use of the dyers, at the price of 1*s*. or 16*d*. per stone. A good many sheep are reared here, and much wool is sent out of the country. There are few horses raised in this country: such as feed on the tops of the higher hills are often afflicted with a distemper that commonly proves fatal, if a remedy is not applied within 24 hours. It attacks them in the months of July and August, usually after a fall of rain, or before the dew rises in the morning. An universal swelling spreads over the body: the remedy is exercise, chasing, or any method that promotes urine and perspiration. The common people attribute this evil to a certain animal that scatters its poison over the grass; but, more probably, it arises from some noxious vegetable hitherto unobserved. Before the year 1745, lord Braidalein was obliged to keep a constant guard for the protection of his vassals cattle, or to retain spies among the thievish clans, having too much spirit to submit to pay an infamous tax; called *blackmeal*, to the plundering chieftains as the price of their safety.

BRAIL, or BRAILS, in a ship, are small ropes made use of to furl the sails across: they belong only to the two courses and the mizen-sail; they are reeved thro' the blocks, seized on each side the ties, and come down before the sail, being at the very skirt thereof fastened to the cringles; their use is, when the sail is furled across, to hale up its bunt, that it may the more easily be taken up or let fall. Hale up the brails, or brail

Dishma

Drail.

* See *Astronomy*, n^o 75.

Bralow
||
Bramhall.

up the fail; that is, Hale up the fail, in order to be furl-
ed or bound close to the yard.

BRAILLOW, a town of Poland, in the province of
Podolia, seated on the river Bog, in E. Long. 29. o.
N. Lat. 43. 50.

BRAIN. See *ANATOMY*, n° 16, 394, 400; also
COMPARATIVE Anatomy, n° 68, *et seq.* and n° 128,
153.

BRAIN le Comte, a town of the Austrian Netherlands,
in the province of Hainault. E. Long. 4. 11.
N. Lat. 50. 35.

BRAINTREE, a large town of Essex in England,
situated in E. Long. o. 35. N. Lat. 51. 50.

BRAKE, denotes female fern, or the place where it
grows.—Also a sharp bit or snaffle for horses; and a
baker's kneading-trough.—Also an instrument with
teeth to bruise flax or hemp; see *FLAX-Dressing*.

BRAKEL, a town of Germany, in the circle of
Westphalia, and in the bishopric of Paderborn, seated
on the rivulet Brught, in E. Long. 9. 8. N. Lat. 51.
46.

BRAMA, or **BRUMA**, a pagan deity of the East
Indies. He is the first person of a kind of trinity in
their theology; is the great progenitor of mankind;
and has created as many worlds as there are considerable
parts in his body †.

BRAMA, in ichthyology, the trivial name of a
species of cyprinus. See *CYPRINUS*.

BRAMANT, a town of Savoy, in the valley of
Maurich, seated on the river Arck, in E. Long. 4. 15.
N. Lat. 45. o.

BRAMBER, a town of Suffex in England, formerly
of some account, but has neither market nor fair;
however, it sends two members to parliament. W.
Long. o. 15. N. Lat. 50. 50.

BRAMBLE, in botany, the English name of the
RUBUS.

BRAMBLE-Net, otherwise called *hallier*, is a net to
catch birds in of several sizes: the great meshes must
be four inches square; those of the least size are three
inches square; and those of the biggest, five. In the
depth they should not be above three or four inches:
but as for the length, they may be enlarged at pleasure;
the shortest being 18 feet long.

BRAMBLE, or *Brambling*, in ornithology, the trivial
name of a species of *FRINGILLA*.

BRAMHALL (Dr John), archbishop of Armagh,
was born of an ancient family at Pontefract in York-
shire, about the year 1593. He was invited over to
Ireland by the lord deputy Wentworth; and soon after
obtained the arch-deacourcy of Meath, the best in that
kingdom. In 1634, he was made bishop of London-
derry, which see he improved very much; but the
greatest service he did to the church of Ireland, was by
getting, with the deputy's assistance, several acts passed
for abolishing fee-farms, recovering impropriations, &c.
by which and by other means he regained to the church
in the space of four years 30,000 or 40,000*l.* a year. In
the convocation he prevailed upon the church of Ireland
to unite in the same faith with the church of England,
by adopting the 39 articles of that church; and would
willingly have introduced the English canons, but could
only prevail on their accepting such as they deemed
proper. Articles of treason were exhibited against
him in the Irish parliament; and at the treaty of Ux-

bridge in 1644, the English parliament made it a pre-
liminary article, that bishop Bramhall, with archbishop
Laud, and others, should be excepted from the general
pardon. He went abroad; but on the restoration was
appointed archbishop of Armagh, primate and metro-
politan of all Ireland, and was chosen speaker of the
house of lords. He died in 1663; and was the author
of several works, which are collected in one vol. folio.

BRAMINS, the name of the priests among the i-
dolatrous Indians; the successors of the ancient Brach-
mans. See the title *BRACHMANS*.

Their name is formed from *Brama*, their particular
deity. They are found in Siam, Malabar, China, Co-
romandel, and most other eastern nations anywise civil-
ized; but their chief seat is in Indostan †, or the Mo-
gul's country. They have a language peculiar to them-
selves; in which they have several ancient books, written
(as is alleged) by their great prophet Brama, and
dictated by God himself.

There are several orders of Bramins. Those who
mix in society are for the most part very corrupt in
their morals: they believe that the water of the Ganges
will wash away all their crimes; and, as they are not
subject to any civil jurisdiction, live without either re-
straint or virtue, excepting that character of compassion
and charity which is so commonly found in the mild
climate of India. The others, who live abstracted
from the world, are either weak-minded men or enthu-
siasts; and abandon themselves to laziness, superstition,
and the dreams of metaphysics. We find in their dis-
putes the very same ideas that occur in the writings of
our most celebrated metaphysicians; such as, substance,
accident, priority, posteriority, immutability, indivisi-
bility, &c.

Their religion, which was anciently of the allegori-
cal and moral kind, hath degenerated into a heap of
extravagant and obscene superstitions, owing to their
having realized those fictions which were intended mere-
ly as so many symbols and emblems. Were it possible
to obtain a sight of their sacred books, the only re-
mains there are of the Indian antiquities, we might in
some measure be enabled to remove the veil that envelops
those numerous mysteries; but the following story will
show how little reason there is to hope that we shall
ever be intrusted with such a communication.

The emperor Mahmoud Akbar had an inclination
to make himself acquainted with the principles of all
the religious sects throughout his extensive provin-
ces. Having discarded the superstitious notions with
which he had been prepossessed by his education in the
Mahometan faith, he resolved to judge for himself. It
was easy for him to be acquainted with the nature of
those systems that are formed upon the plan of making
prophets; but he found himself disappointed in his
design when he came to treat with the Indians, who
will not admit any person whatever to the participation
of their mysteries. Neither the authority nor promises
of Akbar could prevail with the Bramins to disclose
the tenets of their religion; he was therefore obliged
to have recourse to artifice. The stratagem he made
use of was to cause a boy, of the name of Feizi, to
be committed to the care of these priests, as a poor or-
phan of the sacerdotal line, who alone could be initiated
into the sacred rites of their theology. Feizi, having
received the proper instructions for the part he was to
act,

Bramins.

† See the ar-
ticles *Brach-
mans*, *Bra-
mins*, and
Indolians.

† See *Indo-
stan*.

*Reynal's
Hist. of the
Indies.*

Bramins,
Bramponour.

act, was conveyed privately to Benares, the seat of knowledge in Indoftan; he was received into the house of a learned Bramin, who educated him with the same care as if he had been his own son. After the youth had spent ten years in study, Akbar was desirous of recalling him; but he was struck with the charms of the daughter of his preceptor. The women of the sacerdotal tribe are looked upon as the greatest beauties in Indoftan. The old Bramin laid no restraint upon that growing passion of the two lovers: he was fond of Feizi, who had gained his affection by his address and docility; and offered him his daughter in marriage. The young man, divided between love and gratitude, resolved to conceal the fraud no longer; and falling at the feet of the Bramin, discovered the imposture, and asked pardon for his offence. The priest, without reproaching him in the least, seized a poniard which hung at his girdle, and was going to plunge it in his breast, if Feizi had not prevented him by taking hold of his arm. The young man used every means to pacify him, and declared himself ready to do any thing to expiate his treachery. The Bramin, bursting into tears, promised to pardon him on condition that he should swear never to translate the *Bedas*, or sacred volumes, or disclose to any person whatever the symbol of the Bramin creed. Feizi readily promised all that the Bramin required: how far he kept his word is not known; but the sacred books of the Indians have never been translated by him, or any one else, to this day. As the Bramins are the only persons who understand the language of the sacred book, their comments on the text are the same as those that have ever been made on religious books; all the maxims which fancy, interest, passion, or false zeal can suggest, are to be found in these volumes †.

They own a supreme God, who created Brama, and gave him a power to create the world. They have also their subaltern deities, their pagods or temples, and idols, whom they fan to defend from flies, dancing before them. They also hold a feast in honour of the sun, considered as the source of light and heat, whereby all nature is fecundified.

Their pagods or temples consist of three parts. The first is a vaulted roof, supported on stone columns: it lies open, and all persons, without distinction, are allowed to enter into it. It is adorned with symbolical figures, made of wood, as elephants, oxen, and horses. The second part is open in the day-time, and shut at night. It is filled with grotesque and monstrous figures, as men with many heads and arms. The third, which is a kind of chancel, is kept always shut, with a very strong gate. In this is placed the statue of the deity, to whom the pagod is dedicated. A great number of lamps burn day and night before the idol. The Bramins, before they go into the pagod, pull off their shoes, and leave them at the door.

BRAMPOUR, or BRAMPFORE, a city of Asia, in the dominions of the great Mogul, and capital of Candish. It formerly stood on as much ground as London; but is now greatly decayed, and chiefly inhabited by Banians. The streets are numerous, but narrow, with low thatched houses made of earth, though a few are covered with varnished tiles. In rainy weather many of the streets are overflowed. In the market place is the statue of an elephant in red stone, as big as the life. On the other side of the river they have built

a new town, which is in a better situation. A great trade is carried on in this town, and throughout all the province, where there is made a prodigious quantity of cotton-cloths, as cotton is in greater plenty here than in any other place of the empire. E. Long. 77. 25. N. Lat. 21. 10.

BRAMPTON, a town of Cumberland in England, seated not far from the Picts wall, and on the river Irthine. It is a very ancient place, but at present is very small. W. Long. 2. 40. N. Lat. 54. 50.

BRAN, the skins or hulks of corn, especially wheat ground, separated from the flour by a sieve or boulder. It contains, besides, a portion of the farinaceous matter; this is less glutinous than the finer flour, and is supposed to have a detergent quality; infusions of bran are not unfrequently employed in this intention externally, and sometimes likewise taken inwardly.

Among the ancients, bran was used as an erotic, to excite love. Bran boiled, purges scurf, dandruff, and cleanses the hands in lieu of soap. The dyers reckon it among the not-colouring drugs; and use it for making what they call the *four waters*, with which they prepare their several dyes. Bran is also used as a medicine for horfics; see FARRIERY, § 1. 6.

BRANCH, in botany, an arm of a tree, or a part which, sprouting out from the trunk, helps to form the head or crown thereof. Branches do not spring out of the mere surface of the trunk, but are profoundly rooted therein, so as not only to penetrate the cortical, but also the woody substance, and even the pith. The constituent parts therefore of a *branch* are the same as of the trunk, viz. skin, bark, wood, and pith*.

BRANCHES of a *Bridle*, in the menage, are two pieces of iron bended, which, in the interval, between the one and the other, bear the bit-mouth, the cross-chains, and the curb; so that on one end they answer to the head-stall, and on the other to the reins, in order to keep the horse's head in subjection. With regard to their form and structure, branches are either straight, in form of a pistol, for young horses to form their mouth; or after the countable of France's fashion, proper for a horse that carries his head well. Some are in form of a gigit or leg, which will prevent horses from carrying too low: Some are in form of a bent knee, contrived for horses that arm themselves against the operation of the bit; and others after the French fashion, which is hardly above $\frac{1}{4}$ of an inch at the sevile hole, and kneed $1\frac{1}{2}$ inch at the jarret or ham.

It is to be observed, 1. That the farther the branch is from the horse's neck, the more effect it will have. 2. That short branches, *cæteris paribus*, are ruder, and their effects more sudden, than those of longer. 3. That the branch is to be proportioned to the length of a horse's neck; and one may sooner err in choosing one too short than too long.

BRANCHES of *Ogives*, in architecture, are the arches of Gothic vaults. These arches, travelling from one angle to another diagonal-wise, form a cross between the other arches, which make the sides of the square, of which the arches are diagonals.

BRANCH of a *Trench*. See BOYAU.

BRANCH of a *Mine*. See GALLERY.

BRANCH-*Stand*, with falconers, a term used to signify the making a hawk leap from tree to tree, till the dog springs the game.

Brampton
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Branch.

* See the ar-
ticle Plants.

† See the ar-
ticles Skof-
tab and Ve-
dam.

Brancher
a
Branden-
burg.

Branden-
burg.

BRANCHER, among sportsmen, a young hawk, newly taken out of the nest, that can hop from bough to bough.

BRANCHIÆ, or **GILLS**, in the anatomy of fishes, the parts corresponding to the lungs of land-animals. All fishes, except the cetaceous ones, and the pteromyzium, which have lungs, are furnished with these organs of respiration. See *COMPARATIVE Anatomy*, n° 152.

BRANCHIDÆ, in Grecian antiquity, priests of the temple of Apollo, which was at Didymus in Ionia, a province of lesser Asia, towards the Ægean sea, upon the frontiers of Caria. They opened to Xerxes the temple of Apollo, the riches whereof he took away. After which, thinking it unsafe to stay in Greece, they fled to Sogdiana, on the other side of the Caspian sea, upon the frontiers of Persia, where they built a city, called by their own name; but they did not escape the punishment of their crime; for Alexander the Great having conquered Darius king of Persia, and being informed of their treachery, put them all to the sword, and razed their city, thus punishing the impiety of the fathers in their posterity.

BRANCHON, a town of the Austrian Netherlands, in the province of Namur, seated on the river Meuse. E. Long. 4. 40. N. Lat. 50. 32.

BRANDEIS, a town of Bohemia, seated on the river Elbe. E. Long. 14. 25. N. Lat. 50. 15.

BRANDENBURG (Marquitate of), a large country of Germany, having Mecklenburgh and Pomerania on the north; Poland, on the east; Silesia, with the Lusitias, the electorate of Saxony, Anhalt, and duchy of Magdebourg, on the south; and part of the same duchy, and that of Lunenburg, on the west. Its greatest length is near 200 miles, and its greatest breadth near 100. Its northern situation makes it very cold for seven or eight months in winter. The soil in general is far from being fruitful, a great part of it consisting of sand; yet there are several fruitful spots in it; and the whole, under the last and present reign, has been greatly improved, and much better peopled. In some parts there is great plenty of potatoes and turnips; in others of buck-wheat, millet, and flax; in others of tobacco, woad, and other herbs for dyeing. All sorts of colour earths, together with alum, saltpetre, amber, iron, stone, and medicinal springs, are found in it. Abundance of cattle, especially sheep, are bred here; and the woods not only supply the inhabitants with fuel, but with timber, charcoal, tar, and wood-shaves, both for domestic uses and for exportation. The culture of silk also is carried on in this country with great success. The principal rivers by which it is watered are the Elbe, the Oder, the Prignitz, the Havel, the Wart, and the Spre. Some of the rivers and lakes abound in fish, and are united by canals, for the benefit of navigation. They reckon in the whole Mark 120 towns, above 2500 villages, and about 800,000 inhabitants. The states here consist of the nobility and towns, whose assembly-house is in the Spandau-treut at Berlin, and who still enjoy some small remains of their ancient privileges. The hereditary officers of the marquitate are a marshal, chamberlain, cup-bearer, purveyor, sewer, treasurer, and ranger. The king of Prussia, who is also elector of Brandenburg, with his whole court, are Calvinists; but the religion of most of the inhabitants is Lutheranism. The churches of both

persuasions are well endowed, and the laity jointly employed by the government. The Roman-catholics are also tolerated here. In short, every inhabitant enjoys full liberty of conscience. A great variety of manufactures, most of which were introduced by the French refugees, are carried on in the marquitate, especially at Berlin and Potsdam; where are also excellent painters, statuaries, and engravers. By means of these manufactures, fabrics, and arts, not only large sums are kept in the country, but also imported from other parts, to which considerable quantities of the manufactures, and natural productions, are exported. For the education of youth, and the advancement of learning, besides Latin schools in several places, and gymnasia, there is an university at Frankfort on the Oder, and an academy of sciences at Berlin. This marquitate, together with the arch-chamberlain's office, and the electoral dignity, was conferred, in 1415, hereditarily on Frederic V. or VI. burgrave of Nuremberg, in whose family it still remains, with the addition of many other territories and dignities. The present king of Prussia and elector of Brandenburg, Frederic III. is one of the greatest and most powerful princes of Europe, as well as one of the most despotic. He hath greatly enlarged his dominions, by the addition of all the lower, together with the greatest part of the upper Silesia, and the county of Glatz. In 1744, he also took possession of east Friesland; but in 1754, disposed of his share of the succession of the late king William, prince of Orange, to the present prince and stadtholder. The qualifications and talents of this prince are great, and he hath performed many singular actions; but his ambition would have proved his ruin, had he not been supported in the last war by the troops and treasures of Great Britain. It is hard to say, whether his subjects have been greater gainers by his encouraging and promoting commerce, manufactures, agriculture, population, order, and the regular distribution of justice; or sufferers by the wars in which his ambition hath involved them, and the prodigious standing army he keeps constantly on foot, to maintain his conquests, and extend them, as opportunity offers. Such an army must be a great burden, besides their labour being lost in a great measure to the country. Among the electors he possesses the seventh place. As arch-chamberlain, he carries the sceptre before the emperor at his coronation, and brings him water in a silver basin to wash with. In the college of princes of the empire, he has five voices. His assessor, as elector, is 60 horse and 277 foot, or 1828 florins in lieu of them. To the chamber of Wetzlar, his quota is 811 rix-dollars, 58 kruitzers, each term. As to the orders of the knights of the Black Eagle, and of Merit, it is sufficient here to observe, that the former was instituted by Frederic I. at his coronation, and the other by the present king. For the government of this country and the administration of justice, there are several supreme colleges and tribunals; particularly for the departments of war, foreign affairs, and the finances, there are distinct boards. Here is a supreme ecclesiastical council and consistory for the Lutherans; a supreme directory of the Calvinist church; a supreme medicinal college; a supreme mine-office; a college or board of trade, &c. Those of the French nation, settled in this country, are allowed particular courts of their own. The amount of the yearly revenues of the Mark, arising

Brandenburg
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Brandt.

sing from the domains, protection-money paid by the Jews, tolls, land-tax, mines, forests, duties on stamp-paper, salt, and variety of other imposts and excises, is computed at about 2,500,000 crowns; but the money is said to be much inferior in goodness to that of Saxony and the dominions of Hanover. During the late war it was extremely debased. Some estimate the whole number of the inhabitants of the royal and electoral dominions at 5,000,000, and the revenues at about 2,000,000 sterling. The present king and elector keeps upwards of 100,000 men on foot in time of peace, which are said to cost him more than half of his whole revenue. These troops are under strict discipline, very expert at their exercise, always in readiness to march, and always complete. Each regiment has a particular canton or district allotted it for its quarters and raising recruits. The infantry are clothed in blue, and the horse and dragoons in white; and both are required to hear sermon twice a-day when in quarters or garrisons. In time of peace they are allowed, for several months in the year, to hire themselves out, or to follow their business either as burghers or peasants, in the canton where they are quartered; but they are not allowed to marry. A considerable part of these troops are stationed in the Mark, particularly at Berlin and Potsdam. The corps of hussars alone amounts to about 10,000 men. The Mark of Brandenburg is divided, in general, into the electoral and new Marks. The former is again subdivided into the old Mark, the Pregnitz, the middle Mark, and the Ucker Mark. The old Mark, which lies on the west side of the Elbe, between that river and Lunenburg, is about 50 miles in length, and 30 in breadth.

BRANDENBURG, a city of Germany, and capital of the marquissate of that name, situated on the river Havel, in E. Long. 13°. N. Lat. 52. 25. It is divided into the old and new town, and was anciently the see of a bishop. The mountain in the neighbourhood called *Marienberg*, is planted with vines. Here is a small colony of French Calvinists, with a manufacture of cloth, fustian, and canvas; and a pretty good trade is carried on by the Havel. The fort here looks like a suburb, and contains a riding-school, with the cathedral church. The greatest part also of the members of the chapter which still subsists, and is composed of a Lutheran provost, dean, senior, subseior, and three other canons, reside in it. They are distinguished by a cross of gold enamelled with violet, terminating in eight points; and have a considerable citate. Near the town is a large lake.

BRANDON, a town of Suffolk in England, seated on the little river Ouse, over which it has a bridge, and a ferry at a mile's distance: whence it is divided into Brandon, and Brandon-ferry; which last has the most business, because commodities are brought thither from the Isle of Ely. E. Long. 0. 55. N. Lat. 52. 30.

BRANDRITH, a trevet, or other iron utensil, to set a vessel on over the fire.

BRANDT (Gerard), a learned divine of the reformed religion, was born at Amsterdam in 1626, and was successively minister in several places of the Netherlands. He wrote some works which are esteemed, particularly The history of the reformation of the Netherlands, 4 vols 4to; and The life of admiral Ruyter; both written in the Flemish tongue. He died at Rot-

terdam in 1685;

BRANDY, a spirituous and inflammable liquor, extracted from wine and other liquors by distillation†.

Wine-brandy, made in France, is esteemed the best in Europe. They make it wherever they make wine, and for that purpose use wine that is pricked rather than good wine. The chief brandies for foreign trade, and those accounted best, are the brandies of Bourdeaux, Rochelle, Cogniac, Charenton, the Isle of Rhe, Orleans, the county of Blaisois, Poitou, Touraine, Angou, Nantz, Burgundy, and Champaign.

BRANK, an instrument used in some parts of Scotland, and in Staffordshire, for correcting scolding women. It is a sort of head-piece, which opens, and incloses the head of the impatient, while an iron, sharp as a chissel, enters the mouth, and subdues the more dreadful weapon within. Thus harnessed, the offender is led in triumph through the streets. Dr Plot, in his History of Staffordshire, has favoured the world with a minute description and figure of the instrument†, which is there called a *scolding-bridle*; and tells us, he looks upon it "as much to be preferred to the ducking-stool, which not only endangers the health of the party, but also gives the tongue liberty betwixt every dip; to neither of which this is at all liable."

BRANLIN, in ichthyology, a species of salmon, with several transverse black streaks, resembling the impression of so many fingers.

BRANSKA, a town of Transilvania, situated on the river Marish. E. Long. 23. 15. N. Lat. 46. 0.

BRASIDAS, a celebrated general of the Lacedæmonians, about 424 years before the birth of Christ. He defeated the Athenians by land and sea, took many places, and rendered his country formidable to all the neighbouring states. He conquered the Athenians on their attempting to surprize Amphipolis, but died of the wounds he received in that battle*.

BRASIDA, an anniversary solemnity at Sparta, in memory of Brasidas, a Lacedæmonian captain, famous for his achievements at Methone, Pylos, and Amphipolis. It was celebrated with sacrifices and games, wherein none were permitted to contend but free-born Spartans. Whoever neglected to be present at the solemnity was fined.

BRASIL, a large country of South America, being the southernmost part of that continent, lying between the equinoctial line and the tropic of Capricorn. It is about 1560 miles in length, and 1000 in breadth; but, measuring along the coast, it is 2000 miles long, and is bordered with mountains that open from time to time, and form good harbours where vessels may lie in safety. It was accidentally discovered by the Portuguese in 1500. Emanuel king of Portugal had equipped a squadron of 13 sail, carrying 1200 soldiers and sailors destined for the East Indies, under the conduct of Peter Alvarez Cabral. This admiral, quitting Lisbon on the 9th of March 1500, struck out to sea to avoid the coast of Guinea, and steered his course southward, that he might the more easily turn the Cape of Good Hope, which projects a good way into the ocean. On the 24th of April, he got sight of the continent of South America, which he judged to be a large island at some distance from the coast of Africa. Coasting along for some time, he ventured to send a boat on shore; and was astonished to observe the inhabitants

Brandy
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Brasil.

† See Distillation and Spirit of wine.

† P. 389.
Tab. xxxii.

* See Antica, and Lacedæmonia.

Brasil.

Brasil.

bitants entirely different from the Africans in features, hair, and complexion. It was found, however, impracticable to seize upon any of the Indians, who retired with great celerity to the mountains on the approach of the Portuguese; yet, as the sailors had discovered a good harbour, the admiral thought proper to come to an anchor, and called the bay *Puerto Seguro*. Next day he sent another boat on shore, and had the good fortune to lay hold on two of the natives, whom he clothed and treated kindly, and then dismissed, to make a proper report to their countrymen. The stratagem had the desired effect. The Indians, having heard the relation of the prisoners, immediately crowded to the shore, singing, dancing, and founding horns of different kinds; which induced Cabral to land, and take solemn possession in the name of his Portuguese majesty.

As soon as the court of Lisbon had ordered a survey to be taken of the harbours, bays, rivers, and coasts of Brasil, and was convinced that the country afforded neither gold nor silver, they held it in such contempt, that they sent thither none but condemned criminals and abandoned women. Two ships were sent every year from Portugal, to carry the refuse of the kingdom to this new world, and to bring home parrots and woods for the dyers and cabinet-makers. Ginger was afterwards added; but soon after prohibited, lest it should interfere with the sale of the same article from India.

In 1548, the Jews, many of whom had taken refuge in Portugal, beginning to be persecuted by the inquisition, were stripped of their possessions, and banished to Brasil. Here, however, they were not entirely forsaken. Many of them found kind relations and faithful friends; others, who were known to be men of probity and understanding, obtained money in advance from merchants of different nations with whom they had formerly had transactions. By the assistance of some enterprising men, they were enabled to cultivate sugar-canes, which they first procured from the island of Madeira. Sugar, which till then had been used only in medicine, became an article of luxury. Princes and great men were all eager to procure themselves this new species of indulgence. This circumstance proved favourable to Brasil, and enabled it to extend its sugar plantations. The court of Lisbon, notwithstanding its prejudices, began to be sensible, that a colony might be beneficial to the mother-country, without producing gold or silver; and this settlement, which had been wholly left to the capricious management of the colonists, was now thought to deserve some kind of attention; and accordingly Thomas de Souza was sent thither, in 1549, to regulate and superintend it.

This able governor began by reducing these men, who had always lived in a state of anarchy, into proper subordination, and bringing their scattered plantations closer together; after which he applied himself to acquire some information respecting the natives, with whom he knew he must be incessantly engaged either in traffic or war. This it was no easy matter to accomplish. Brasil was full of small nations, some of which inhabited the forests, and others lived in the plains and along the rivers. Some had settled habitations; but the greater number of them led a roving life, and most of them had no intercourse with each other. It is not to be supposed that such a people

would be at all disposed to submit to the yoke which the Portuguese wanted to put upon them on their arrival. At first they only declined all intercourse with these strangers: but finding themselves pursued in order to be made slaves, and to be employed in the labours of the field, they took the resolution to murder and devour all the Europeans they could seize upon. The friends and relations of the savages that were taken prisoners, also ventured to make frequent attempts to rescue them, and were sometimes successful; so that the Portuguese were forced to attend to the double employments of labour and war.

Souza did not bring a sufficient number of forces to change the situation of affairs. Indeed, by building San Salvador, he gave a centre to the colony; but the honour of settling, extending, and making it really useful to the mother-country, was reserved for the Jesuits who attended him. These men, who for their arts of insinuation and address have been equalled by none, dispersed themselves among the Indians. When any of the missionaries were murdered, they were immediately replaced by others; and seeming to be inspired only with sentiments of peace and charity, the Indians, in process of time, grew not only familiar but passionately fond of them. As the missionaries were too few in number to transact all the business themselves, they frequently deputed some of the most intelligent Indians in their stead. These men having distributed hatchets, knives, and looking glasses, among the savages they met with, represented the Portuguese as a harmless, humane, and good sort of people.

The prosperity of the colony of Brasil, which was visible to all Europe, excited the envy of the French, Spaniards, and Dutch successively. The latter, indeed, bid fairest for the conquest of the whole. Their admiral Henry Louk arrived, in the beginning of the year 1630, with 46 men of war, on the coast of Fernambucca, one of the largest and best fortified captainships of these parts. He reduced it after several obstinate engagements, in which he was always victorious. The troops he left behind subdued the captainships of Temaraca, Pareiba, and Rio Grande, in the years 1633, 1634, and 1635. These, as well as Fernambucca, furnished annually a large quantity of sugar, a great deal of wood for dying, and other commodities. The Hollanders were so elated with the acquisition of this wealth, which flowed to Amsterdam instead of Lisbon, that they determined to conquer all the Brasils, and entrusted Maurice of Nassau with the conduct of this enterprise. That general reached the place of his destination in the beginning of the year 1637. He found the soldiers so well disciplined, the commanders such experienced men, and so much readiness in all to engage, that he directly took the field. He was successively opposed by Albuquerque, Banjola, Lewis Rocca de Borgia, and the Brazilian Cameron, the idol of his people, passionately fond of the Portuguese, brave, active, cunning, and who wanted no qualification necessary for a general, but to have learned the art of war under able commanders. These several chiefs exerted their utmost efforts to defend the possessions that were under their protection; but their endeavours proved ineffectual. The Dutch seized upon the captainships of Siara, Serregippe, and the greater part of that of Bahia. Seven of the 15 provinces which composed the colony had already

ready

ready submitted to them, and they flattered themselves that one or two campaigns would make them masters of the rest of their enemies' possessions in that part of America; when they were suddenly checked by the revolution happening on the banishment of Philip IV. and placing the duke of Braganza on the throne. After this, the Portuguese recovering their spirits, soon drove the Dutch out of Brasil, and have continued masters of it ever since.

The country of Brasil is divided into the following provinces, viz. Paria, Maragnano, Siara, Rio Grande, Pareiba, Tamarica, Fernambuco, Seregippe, Bahia, Porto Seguro, Esperito Santo, Rio de Janeiro, Angra, St Vincent, and Del Rey. See these articles.

The first aspect of the country from the sea is rather unfavourable, as it appears high, rough, and unequal; but, on a more narrow inspection, nothing can be more delightful, the eminences being covered with woods, and the valleys and savannahs with the most refreshing verdure. In so vast a tract of land, it cannot be imagined that the climate will be found at all equal, or the seasons uniform. The northern provinces are subject to heavy rains and variable winds, like other countries under the same parallels. Tornadoes, storms, and the utmost fury of the elements, wreak their vengeance here; while the southerly regions are blessed with all the comforts which a fine fertile soil and temperate climate can afford. In some of the provinces, the heat of the climate is thought to prove favourable to the generation of a great variety of poisonous reptiles; some of which, as the *liboya*, or *roebuck* snake, are said to extend to the length of 30 feet, and to be two or three yards in circumference. The rattlesnake, and other reptiles of the same kind, grow likewise to an enormous size; and the serpent called *ibibaboka* is affirmed to be seven yards long, and half a yard in circumference, possessed too of a poison instantaneously fatal to the human race. Here also are scorpions, ant-bears, tigers or madilloes, porcupines, *janoveras*, and an animal called *tapirafon*, which is the production of a bull and an ass, having a great resemblance to both. No country on earth affords a greater number of beautiful birds, nor variety of the most exquisite fruits; but the chief commodities are Brasil wood, ebony, dying woods, ambergris, rosin, balsams, indigo, sweetmeats, sugar, tobacco, gold, diamonds, beautiful pebbles, crystal, emeralds, jasper, and other precious stones; in all which the Portuguese carry on such an amazing trade, as may justly be reputed the support, and indeed the vital fountain, of the mother-country. The gold and diamond mines are but a recent discovery: they were first opened in the year 1681; and have since yielded above five millions sterling annually, of which sum a fifth belongs to the crown. So plentiful are diamonds in this country, that the court of Portugal hath found it necessary to restrain their importation, to prevent too great a diminution of their value. They are neither so hard, nor so clear, as those of the East Indies, nor do they sparkle so much, but they are whiter. The Brazilian diamonds are sold ten per cent. cheaper than the Oriental ones, supposing the weights to be equal. The largest diamond in the world was sent from Brasil to the king of Portugal. It weighs 1680 carats, or 12½ ounces; and has been valued at 56,787,500*l*. Some skilful lapidaries, however, are of opinion that this supposed diamond is only a to-

paz; in which case a very great abatement must be made in its value. The crown-revenue arising from this colony amounts to two millions sterling in gold, if we may credit some late writers, besides the duties and customs on merchandize imported from that quarter. This indeed is more than a fifth of the precious metal produced by the mines; but, every other consequent advantage considered, it probably does not much exceed the truth. The excessive confluence of people to the Brasil colonies, as well from other countries as from Portugal, not only enlarges the imports of gold, but, what is of infinitely more importance to Europe in general, the exportation of the manufactures of this hemisphere; of which the principal are the following. Great Britain sends woollen manufactures; such as fine broad medley cloths, fine Spanish cloths, scarlet and black cloths; ferges, duroys, druggets, sagathies, shalloons, camblets, and Norwich stuffs; black Colchester bays; says, and perpetuanas called *long elts*; hats, stockings, and gloves.

Holland, Germany, and France, chiefly export fine hollands, bone-lace, and fine thread; silk manufactures, pepper, lead, block tin, and other articles, are also sent from different countries. Besides the particulars already specified, England likewise trades with Portugal, for the use of the Brasils, in copper and brass, wrought and unwrought pewter, and all kinds of hardware: all which articles have so enlarged the Portuguese trade, that, instead of 12 ships usually employed in the Brasil commerce, there are now never fewer than 100 sail of large vessels constantly going and returning to those colonies. To all this may be added the vast slave-trade carried on with the coast of Africa for the use of the Brasil colonies; which, we may believe, employs a great number of shipping, from the multitude of slaves that are annually transported. Indeed the commerce of Brasil alone is sufficient to raise Portugal to a considerable height of naval power, as it maintains a constant nursery of seamen: yet a certain insatiation in the policy of the country has prevented that effect even amidst all these extraordinary advantages. All the ships in this trade, being under the direction of the government, have their appointed seasons of going and returning, under convoy of a certain number of men of war: nor can a single ship clear out or go, except with the fleet, but by a special licence from the king, which is seldom granted; though it is easily determined, that such restrictions can prove no way beneficial to the general commerce, though possibly the crown-revenue may be better guarded thereby. The fleets sail in the following order, and at the following stated periods: That to Rio de Janeiro sets sail in January; the fleet to Bahia, or the bay of All Saints, in February; and the third fleet, to Fernambuco, in the month of March.

BRASIL-WOOD, or *Brazil-wood*, an American wood of a red colour, and very heavy. It is denominated variously, according to the places from whence it is brought: Thus we have brasil of Fernambuco, Japan, Lamón, &c. For its description, &c. see *CÆSALPINA*.

BRASILETTO, the same with Brasil-wood.

BRASLAW, a considerable town of Poland, in Lithuania, and palatinate of Wilna, with a castle. It is seated on a small lake, in E. Long. 17. 5. N. Lat. 55. 45.

BRASS, or, as the French call it, *yellow copper*, is

Brass.

a fictitious metal, made of copper and zinc, or lapis calaminaris. See CHEMISTRY, n° 377.

† Gen. iv. The first formation of brass, as we are assured by scripture, was prior to the flood, and discovered even in the seventh generation from Adam†. But the use of it was not, as is generally believed, and the Arundelian marbles assert, previous to the knowledge of iron. They were both first known in the same generation, and first wrought by the same discoverer. And the knowledge of them must have been equally carried over the world afterwards, with the spreading of the colonies of the Noachide. An acquaintance with the one or the other was absolutely necessary to the existence of the colonists; the clearing away of the woods about their settlements, and the erection of houses for their habitation.

The ancient Britons, though acquainted from the remotest periods with the use of both these metals, remained long ignorant that they were to be obtained in the island. Before this discovery they imported all their iron and brass from the continent. And when they had at length detected the former in their own hills, and had ceased to introduce it, they continued to receive the latter. Their want of the metal remained, and no mines of it were opened in the island. In the earliest ages, whose manners have been delineated by history, we find the weapons of their warriors invariably framed of this fictitious metal; and the most authentic of all the profane records of antiquity, the Arundelian marbles, for that reason, mistakenly date the first discovery of iron a couple of centuries below the Trojan war. Every military nation, as such, is naturally studious of brightness in its arms; and the Britons, particularly, gloried in the neatness of theirs. For this reason the nations of the world still fabricated their arms of brass, even long after the Arundelian æra for the discovery of iron; and the Britons continued to import it from the continent, though they had found iron to be a native of the country, and could have supplied themselves with a sufficient quantity of it.

† Hist. of
Manchester.

Mr Whittaker† supposes, that when the Britons derived their iron and brass from the continent, they purchased the latter at an easier expence than the former. The Gauls had many large brass works carried on in the kingdom, but seem to have had few iron forges within it. And this would naturally induce the Belgæ to be less diligent in their inquiry after the veins of copper and calamine at home, than for the courses of iron ore; though the one was equally discoverable in the island as the other, and lay equally within the Belgic regions of it. Brass being thus cheaper than iron, they necessarily formed with it some domestic as well as military implements. Such were common among the Gauls; and such were familiar to the Britons, either imported into the island, as some actually were, or manufactured within it, as others also assuredly were. The Britons had certainly brass founderies erected among them, and minted money, and fabricated weapons of brass.

In this condition of the works, the Romans entered the island. And, seeing so great a demand among the natives for this article, they would speedily instruct them to discover the materials of it among themselves. This must unavoidably have resulted from the conquest of the Romans. The power of surprising their new

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subjects with so unexpected a discovery would naturally stimulate the pride of the Roman intellect; and the desire of obliging themselves with so cheap a supply of that useful metal, stationary as they were in that kingdom, would also equally actuate the selfishness of the Roman heart. The veins of copper and calamine would be easily found out by an experienced inquirer after them; and the former metal is therefore distinguished among the Welsh, only by the Roman appellation of *cyprum, koppr*, or copper. And many founderies of brass appear to have been established in the island. Some had been erected before, one perhaps within the confines of every kingdom, and probably in the vicinity of every capital. One at least would be necessary, in order to supply the armory of the principality; and one perhaps was sufficient for most of the British states. But several appear now to have been settled in every kingdom, and one perhaps near every stationary town. Two have been discovered in the single county of Essex, and within a narrow portion of it at Fifeeld and Danbury. And a third was placed upon Easterly Moor in Yorkshire, 12 miles to the north-west of York, and in the neighbourhood of Ilfrum or Aldborough.

Corinthian Brass, famous in antiquity, is a mixture of gold, silver, and copper. L. Mummius having sacked and burnt the city of Corinth, 146 years before Christ, it is said this metal was formed from the immense quantities of gold, silver, and copper, wherewith that city abounded, thus melted and run together by the violence of the conflagration.

Brass, in the glass trade.—Thrice-calced brass is a preparation which serves the glassmen to give many very beautiful colours to their metal. The manner of preparing it is this: Place thin plates of brass on tiles on the leet of the furnace near the ochsis; let it stand to be calced there for four days and it will become a black powder sticking together in lumps. Powder this, sift it fine, and recalcine it four or five days more; it will not then stick together, but remain a loose powder, of a russet colour. This is to be calced a third time in the same manner; but great care must be taken in the third calcination, that it be not overdone nor underdone; the way to be certain when it is right, is, to try it several times in glass while melting. If it makes it, when well purified, to swell, boil, and rise, it is properly calced; if not, it requires longer time. This makes, according to the different proportions in which it is used, a sea-green, an emerald green, or a turquoise colour.

Brass, by long calcination alone, and without any mixture, affords a fine blue or green colour for glass; but they have a method of calcining it also with powdered brimstone, so as to make it afford a red, a yellow, or a chalcodony colour, according to the quantity and other variations in the using it. The method of making the calcination is this: Cut thin plates of brass into small pieces with sheers, and lay them stratum super stratum, with alternate beds of powdered sulphur, in a crucible; calcine this for 24 hours in a strong fire; then powder and sift the whole; and finally, expose this powder upon tiles for 12 days to a reverberating furnace; at the end of this time, powder it fine, and keep it for use. The glass-makers have also a method of procuring a red powder from brass, by a more simple calci-

calcination, which serves them for many colours. The method of preparing it is this: They put small and thin plates of brasa into the arches of the glass furnaces, and leave them there till they are sufficiently calcined, which the heat in that place, not being enough to melt them, does in great perfection. The calcined matter powdered, is of a dusky red, and requires no farther preparation.

BRASS-COLOUR, one prepared by the braziers and colour-men to imitate brasa. There are two sorts of it; the red brasa, or bronze, and the yellow or gilt brasa: the latter is made only of copper-filings, the smallest and brightest that can be found; with the former they mix some red ochre, finely pulverized; they are both used with varnish.—In order to make a fine brasa that will not take any rust or verdigrease, it must be dried with a chafing-dish of coals as soon as it is applied.—The finest brasa colour is made with powder-brasa imported from Germany, diluted into a varnish, made and used after the following manner. The varnish is composed of one pound four ounces of spirit of wine, two ounces of gum-lac, and two ounces of sandarac; these two last drugs are pulverized separately, and afterwards put to dissolve in spirit of wine, taking care to fill the bottle but half full. The varnish being made, you mix such quantity as you please of it with the pulverized brasa, and apply it with a small brush to what you would brasa over. But you must not mix too much at once, because the varnish being very apt to dry, you would not have time to employ it all soon enough; it is therefore better to make the mixture at several times. After this manner they brasa over figures of plaster, which look as well as if they were of cast brasa.

BRASS-LUMPS, a common name given by miners to the globular pyrites. See PYRITES.

BRASSAW, or **CRONSTADT**, a strong town of Transilvania in Burezlund; seated on the river Buxel, in E. Long. 22. 35. N. Lat. 46. 30.

BRASSE, in ichthyology, a species of PERCA.

BRASSICA, **CABBAGE**; a genus of the siliquosa order, belonging to the tetradynamia class of plants.

Species. I. The oleracea, or common white cabbage. Of this there are commonly reckoned the following varieties. 1. The sabauda, or Savoy cabbage. 2. The rubra, or red cabbage. 3. The pyramidalis, or sugar-loaf cabbage. 4. The præcox, or early cabbage. 5. The peregriua, or foreign mull-cabbage. 6. The muscovitica, or small Russia cabbage. 7. The capitata, or large-headed cabbage. 8. The viridis, or green Savoy. 9. The laciniata, or borecole. 10. The selenisia, or green borecole. 11. The fimbriata, or Siberian borecole, by some called *Scotch kale*. Of these Mr Miller thinks the second sort is undoubtedly a distinct species; as he always found the seeds produce the same, with this difference only, that in good ground the stalks are much larger than in poor land. The other species are, 11. The napo brassica, or turnip-rooted cabbage. 111. The botrytis, or cauliflowers, which hath two varieties, viz. Purple and white broccoli. IV. The sylvestris, or taller shrubby sea-cabbage. V. The violacea, with entire, oval, spear-shaped, smooth, leaves, which are indented. VI. The purpurea, with oblong, heart-shaped leaves, embracing the stalks, which are entire. VII. The orientalis, or colewort with heart-shaped smooth leaves, which embrace the stalk. VIII. The gongyloides, wild navew, or cole-seed. To

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these species Linnæus joins the turnip, navew, and rocket; but as it would be apt to breed confusion to class these plants along with cabbages, when speaking of their culture and uses, however proper it may be in a system of botany, we shall speak of them under their proper names.

Culture, &c. The second sort never varies. It grows naturally on the sea-shore near Dover. It hath a perennial branching stalk, in which it differs from all the other species. In very severe winters, when the other sorts are destroyed, this is a necessary plant, for the most severe frosts do not injure it. The flower-stalks grow from the end of the branches, and spread out horizontally; but those which arise from the centre of the plants grow erect, and seldom put out branches. The cauliflower has been much more improved in Britain than in any other part of Europe. In France they rarely have cauliflowers till Michaelmas, and Holland is generally supplied with them from Britain. In many parts of Germany there were none of them cultivated till within a few years past, and most parts of Europe are supplied with seeds from Britain. The eighth sort, which is generally known by the title of *rape* or *cole seed*, is much cultivated in the isle of Ely, and some other parts of England, for its seed, from which rape-oil is drawn; and it hath also been cultivated of late years, in other places, for feeding of cattle, to great advantage. The cole seed, when cultivated for feeding of cattle, should be sown about the middle of June. The ground for this should be prepared for it in the same manner as for turnips. The quantity of seeds for an acre of land is from six to eight pounds; and as the price of the seed is not great, so it is better to allow eight pounds; for if the plants are too close in any part, they may be easily thinned when the ground is hoed, which must be performed in the same manner as is practised for turnips, with this difference only, of leaving these much nearer together; for as they have fibrous roots and slender stalks, so they do not require near so much room. These plants should have a second hoeing, about five or six weeks after the first, which, if well performed in dry weather, will entirely destroy the weeds, so they will require no farther culture. Where there is not an immediate want of food, these plants had better be kept as a reserve for hard weather, or spring feed, when there may be a scarcity of other green food. If the heads are cut off, and the stalks left in ground, they will shoot again early in the spring, and produce a good second crop in April; which may be either fed off, or permitted to run to seeds, as is the practice where this is cultivated for the feeds: but if the first is fed down, there should be care taken that the cattle do not destroy their stems, or pull them out of the ground. As this plant is so hardy as not to be destroyed by frost, so it is of great service in hard winters for feeding of ewes; for when the ground is so hard frozen as that turnips cannot be taken up, these plants may be cut off for a constant supply. This will afford late food after the turnips are run to feed; and if it is afterwards permitted to stand for seed, one acre will produce as much as, at a moderate computation, will sell for five pounds, clear of charges. Partridges, pheasants, turkeys, and most other fowl, are very fond of this plant; so that wherever it is cultivated, if there are any birds in the neighbourhood, they will constantly

lie among these plants. The seeds of this plant are sown in gardens for winter and spring fallads, this being one of the small fallad herbs.

The common white, red, flat, and long-sided cabbages are chiefly cultivated for autumn and winter use; the seeds of these sorts must be sown the beginning or middle of April, in beds of good fresh earth; and when the young plants have about eight leaves, they should be pricked out into shady borders, about three or four inches square, that they may acquire strength, and to prevent their growing long shanked. About the middle of June you must transplant them out, where they are to remain. If they are planted for a full crop in a clear spot of ground, the distance from row to row should be three feet and a half, and in the rows two feet and a half asunder: if the season should prove dry when they are transplanted out, you must water them every other evening until they have taken fresh root; and afterwards, as the plants advance in height, you should draw the earth about their stems with a hoe, which will keep the earth moist about their roots, and greatly strengthen the plants. These cabbages will come of them be fit for use soon after Michaelmas, and will continue until the end of February, if they are not destroyed by bad weather; to prevent which, the gardeners near London pull up their cabbages in November, and trench their ground up in ridges, laying their cabbages against their ridges as close as possible on one side, burying their stems in the ground: in this manner they let them remain till after Christmas, when they cut them for the market; and although the outer part of the cabbage be decayed (as is often the case in very wet or hard winters), yet, if the cabbages were large and hard when laid, the inside will remain sound.

The Russian cabbage was formerly in much greater esteem than at present, it being now only to be found in particular gentlemen's gardens, who cultivate it for their own use. This must be sown late in the spring of the year, and managed as those before directed, with this difference only, that these must be sooner planted out, and must have an open clear spot of ground, and require much less distance every way, for it is but a very small hard cabbage. This sort will not continue long before they will break and run up to seed.

The early and sugar-loaf cabbages are commonly sown for summer use, and are what the gardeners about London commonly call *Michaelmas cabbages*. The season for sowing of these is about the end of July, or beginning of August, in an open spot of ground; and when the plants have got eight leaves, you must prick them into beds at about three or four inches distance every way, that the plants may grow strong and short shanked, and toward the end of October you should plant them out: the distance that these require is, three feet row from row, and two feet and a half asunder in the rows. The ground must be kept clean from weeds, and the earth drawn up about your cabbage plants. In May, if your plants were of the early kind, they will turn in their leaves for cabbaging; at which time, the gardeners near London, in order to obtain them a little sooner, tie in their leaves close with a slender osier-twig to blanch their middles; by which means, they have them at least a fortnight sooner than they could have if they were left untied.

The early cabbage being the first, we should chuse

to plant the fewer of them, and a greater quantity of the sugar-loaf kind, which comes after them; for the early kind will not supply the kitchen long, generally cabbaging apace when they begin, and as soon grow hard and burst open; but the sugar-loaf kind is longer before it comes, and is as slow in its cabbaging; and being of an hollow kind, will continue for a good long time. The sugar-loaf kind may be planted out in February, and will succeed as well as if planted earlier; with this difference only, that they will be later before they cabbage. You should also reserve some plants of the early kind in some well-sheltered spot of ground, to supply your plantation, in case of a defect; for in mild winters many of the plants are apt to run to seed, especially when their seeds are sown too early, and in severe winters they are often destroyed.

The Savoy cabbages are propagated for winter use, as being generally esteemed the better when pinched by the frost: these must be sown about the end of April, and treated after the manner as was directed for the common white cabbage; with this difference, that these may be planted at a closer distance than those; two feet and a half square will be sufficient. These are always much better when planted in an open situation, which is clear from trees and hedges; for in close places they are very subject to be eaten almost up by caterpillars and other vermin, especially if the autumn prove dry.

The borecole may also be treated in the same manner, but need not be planted above one foot asunder in the rows, and the rows two feet distance; these are never eaten till the frost hath rendered them tender, for otherwise they are tough and bitter.

The seeds of the broccoli (of which there are several kinds, viz. the Roman or purple, the Neapolitan or white, and the black broccoli, with some others, but the Roman is preferred to them all), should be sown about the latter end of May, or beginning of June, and when the plants are grown to have eight leaves, transplant them into beds (as was directed for the common cabbage); and toward the latter end of July they will be fit to plant out, which should be done into some well-sheltered spot of ground, but not under the drip of trees: the distance these require is about a foot and a half in the rows, and two feet row from row. The soil in which they should be planted ought to be rather light than heavy: if your plants succeed well (as there will be little reason to doubt, unless the winter prove extreme hard), they will begin to show their small heads, which are somewhat like a cauliflower, but of a purple colour, about the end of December, and will continue eatable till the middle of April. The brown or black broccoli is by many persons greatly esteemed, though it doth not deserve a place in the kitchen-garden where the Roman broccoli can be obtained, which is much sweeter, and will continue longer in season: indeed, the brown sort is much harder, so that it will thrive in the coldest situations, where the Roman broccoli is sometimes destroyed in very hard winters. The brown sort should be sown in the middle of May, and managed as hath been directed for the common cabbage, and should be planted at the same distance, which is about two feet and a half asunder. This will grow very tall, so should have the earth drawn up to their stems as they advance in height. This doth not form heads so perfect as the Roman broccoli; the stems and hearts of the plants

plants are the parts which are eaten. The Roman broccoli (if well managed) will have large heads, which appear in the centre of the plants like clusters of buds. These heads should be cut before they run up to feed, with about four or five inches of the stem; the skin of these stems should be stripped off before they are boiled. After the first heads are cut off, there will be a great number of side shoots produced from the stems, which will have small heads to them, but are full as well flavoured as the large. The Naples broccoli hath white heads very like those of the cauliflower, and eats so like it as not to be distinguished from it.—Besides this first crop of broccoli (which is usually sown in the end of May), it will be proper to sow another crop the beginning of July, which will come in to supply the table the latter end of March and the beginning of April; and being very young, will be extremely tender and sweet.

In order to save good seeds of this kind of broccoli, you should reserve a few of the largest heads of the first crop, which should be let remain to run up to feed, and all the under shoots should be constantly stripped off, leaving only the main stem to flower and feed. If this be duly observed, and no other sort of cabbage permitted to feed near them, the seeds will be as good as those procured from abroad, and the sort may be preserved in perfection many years.

The turnip-rooted cabbage was formerly more cultivated in Britain than at present, for since other sorts have been introduced which are much better flavoured, this sort has been neglected. There are some persons who esteem this kind for soups, but it is too strong for most palates; and is seldom good but in hard winters, which will render it tender and less strong. At the end of June the plants should be transplanted out where they are to remain, allowing them two feet distance every way, observing to water them until they have taken root; and as their stems advance, the earth should be drawn up to them with a hoe, which will preserve a moisture under their roots, and prevent their stems from drying and growing woody, so that the plants will grow more freely; but it should not be drawn very high, for as it is the globular part of the stalk which is eaten, so that should not be covered. In winter they will be fit for use, when they should be cut off, and the stalks pulled out of the ground and thrown away, being good for nothing after the stems are cut off.

The curled colewort or Siberian borecole is now more generally esteemed than the former, being extreme hardy, so is never injured by cold, but is always sweeter in severe winters than in mild seasons. This may be propagated by sowing of the seeds the beginning of July; and when the plants are strong enough for transplanting, they should be planted in rows about a foot and a half asunder, and ten inches distance in the rows. These will be fit for use after Christmas, and continue good until April, so that they are very useful in a family.

The musk cabbage. This may be propagated in the same manner as the common cabbage, and should be allowed the same distance: it will be fit for use in October, November, and December; but, if the winter proves hard, these will be destroyed much sooner than the common sort.

The common colewort or Dorsetshire kale, is now

almost lost near London, where their markets are usually supplied with cabbage plants instead of them. The best method to cultivate this plant in the fields is, to sow the seeds about the beginning of July, choosing a moist season, which will bring up the plants in about ten days or a fortnight; the quantity of seed for an acre of land is nine pounds: when the plants have got five or six leaves they should be hoed, as is practised for turnips, cutting down all the weeds from amongst the plants, and also thinning the plants where they are too thick; but they should be kept thicker than turnips, because they are more in danger of being destroyed by the fly: this work should be performed in dry weather, that the weeds may be killed. About six weeks after the plants should have a second hoeing, which, if carefully performed in dry weather, will entirely destroy the weeds, and make the ground clean, so that they will require no farther culture: in the spring they may be either drawn up and carried out to feed the cattle, or they may be turned in to feed upon them as they stand; but the former method is to be preferred, because there will be little waste; whereas, when the cattle are turned in amongst the plants, they will tread down and destroy more than they eat, especially if they are not fenced off by hurdles.

The two last sorts of cabbages are varieties fit for a botanic garden, but are plants of no use. They are annual plants, and perish when they have perfected their seeds.

The best method to save the seeds of all the sorts of cabbages is, about the end of November you should make choice of some of your best cabbages, which you should pull up, and carry to some shed or other covered place, where you should hang them up for three or four days by their stalks, that the water may drain from between their leaves; then plant them in some border near a hedge or pale, quite down to the middle of the cabbage, leaving only the upper part of the cabbage above ground, observing to raise the earth above it, so that it may stand a little above the level of the ground; especially if the ground is wet, they will require to be raised pretty much above the surface. If the winter should prove very hard, you must lay a little straw or pease-haulm lightly upon them, to secure them from the frost, taking it off as often as the weather proves mild, lest by keeping them too close they should rot. In the spring of the year these cabbages will shoot out strongly, and divide into a great number of small branches: you must therefore support their stems, to prevent their being broken off by the wind; and if the weather should be very hot and dry when they are in flower, you should refresh them with water once a week all over the branches, which will greatly promote their feeding, and preserve them from mildew. When the pods begin to change brown, you will do well to cut off the extreme part of every shoot with the pods, which will strengthen your seeds; for it is generally observed, that those seeds which grow near the top of the shoots, are very subject to run to seed before they cabbage; so that by this there will be no loss, but a great advantage. When your seeds begin to ripen, you must be particularly careful that the birds do not destroy it, for they are very fond of these seeds. The best method to prevent this, is to get a quantity of birdlime, and dawb over a parcel of slender twigs, which should be fast-

ened at each end to stronger sticks, and placed near the upper part of the feed in different places, so that the birds may alight upon them, by which means they will be fattened thereto; where you must let them remain, if they cannot get off themselves: and although there should not above two or three birds be caught, yet it will sufficiently terrify the rest, that they will not come to that place again for a considerable time after.

When your feed is fully ripe, you must cut it off; and after drying, thresh it out, and preserve it in bags for use.

But in planting of cabbages for feed, it will be proper never to plant more than one fort in a place, or near one another: for example, never plant red and white cabbages near each other, nor Savoy with white or red cabbages; for they will, by the commixture of their effluvia, produce a mixture of kinds: and it is said to be owing to this neglect, that the gardeners rarely save any good red cabbage feed in Britain, but are obliged to procure fresh seeds from abroad; as supposing the soil or climate of Britain alters them from red to white, and of a mixed kind betwixt both; whereas, if they should plant red cabbages by themselves for seeds, and not suffer any other to be near them, they might continue the kind as good in Britain as in any other part of the world.

Cauliflowers have of late years been so far improved in Britain, as to exceed in goodness and magnitude what are produced in most parts of Europe, and by the skill of the gardener are continued for several months together; but the most common season for the great crop is in May, June, and July. Having procured a parcel of good feed, you must sow it about the 21st of August, upon an old cucumber or melon-bed, sifting a little earth over the seeds, about a quarter of an inch thick; and if the weather should prove extreme hot and dry, you should shade the beds with mats, to prevent the earth from drying too fast, and give it gentle waterings as you may see occasion. In about a month's time after sowing, your plants will be fit to prick out: you should therefore put some fresh earth upon your cucumber or melon beds; or where these are not to be had, some beds should be made with a little new dung, which should be trodden down close, to prevent the worms from getting through it; but it should not be hot dung, which would be hurtful to the plants at this season, especially if it proves hot; into this bed you should prick your young plants at about two inches square, observing to shade and water them at first planting; but do not water them too much after they are growing, nor suffer them to receive too much rain if the season should prove wet, which would be apt to make them black shanked (as the gardeners term it, which is no less than a rotteness in their stems), and is the destruction of the plants so affected. In this bed they should continue till about the 30th of October, when they must be removed into the place where they are to remain during the winter season; which, for the first sowing, is commonly under bell or hand glasses, to have early cauliflowers, and these should be of an early kind: but in order to have a succession during the season, you should be provided with another more late kind, which should be sown four or five days after the other, and managed as was directed for them. In order to have very early cauliflowers, you should make

choice of a good rich spot of ground that is well defended from the north, east, and west winds, with hedges, pales, or walls; but the first are to be preferred, if made with reeds, because the winds will fall dead in these, and not reverberate as by pales or walls. This ground should be well trenched, burying therein a good quantity of rotten dung; then level your ground, and if it be naturally a wet soil, you should raise it up in beds about two feet and a half, or three feet broad, and four inches above the level of the ground; but if your ground is moderately dry, you need not raise it at all: then plant your plants, allowing about two feet six inches distance from glass to glass in the rows, always putting two good plants under each glass, which may be at about four inches from each other; and if you design them for a full crop, they may be three feet and a half row from row: but if you intend to make ridges for cucumbers between the rows of cauliflower plants, (as is generally practised by the gardeners near London) you must then make your rows about eight feet asunder; and the ground between the rows of cauliflowers may be planted with cabbage plants, to be drawn off for coleworts in the spring. When you have planted your plants, if the ground is very dry you should give them a little water, and then set your glasses over them, which may remain quite close down over them till they have taken root, which will be in about a week or ten days time, unless there should be a kindly shower of rain; in which case you may set off the glasses, that the plants may receive the benefit of it; and in about ten days after planting, you should be provided with a parcel of forked sticks or bricks, with which you should raise your glasses about three or four inches on the side toward the south, that your plants may have free air: in this manner your glasses should remain over the plants night and day, unless in frosty weather, when you should set them down as close as possible; or if the weather should prove very warm, which many times happens in November, and sometimes in December, in this case you should keep your glasses off in the day-time, and put them on only in the night, lest, by keeping the glasses over them too much, you should draw them into flower at that season; which is many times the case in mild winters, especially if unskillfully managed. Toward the latter end of February, if the weather proves mild, you should prepare another good spot of ground to remove some of the plants into from under the glasses, which should be well dunged and trenched (as before); then set off your glasses; and, after making choice of one of the most promising plants under each glass, which should remain, take away the other plant, by raising it up with a trowel, &c. so as to preserve as much earth to the root as possible; but take care not to disturb or prejudice the roots of the plants which remain. Then plant the plants which you have taken out at the distance before directed, viz. if for a full crop, three feet and a half, row from row; but if for ridges of cucumbers between them eight feet, and two feet four inches distance in the rows: then, with a small hoe, draw the earth up to the stems of the plants which were left under the glasses, taking great care not to let the earth fall into their hearts; and set your glasses over them again, raising your props an inch or two higher than before, to give them more air, observing to take them off whenever there may be some gentle showers, which

Brafica.

which will greatly refresh the plants.

In a little time after, if you find your plants grow so fast as to fill the glasses with their leaves, you should then slightly dig about the plants, and raise the ground about them in a bed broad enough for the glasses to stand, about four inches high, which will give your plants a great deal of room, by raising the glasses so much higher when they are set over them; and by this means they might be kept covered until April, which otherwise they could not, without prejudice to the leaves of the plants; and this is a great advantage to them, for many times we have returns of severe frosts at the latter end of March, which prove very hurtful to these plants, if exposed thereto, especially after having been nursed up under glasses.

After you have finished your beds, you may set your glasses over your plants again, observing to raise your props pretty high, especially if the weather be mild, that they may have free air to strengthen them; and in mild soft weather let off your glasses, as also in gentle showers of rain; and now you must begin to harden them by degrees to endure the open air; however, it is advisable to let your glasses remain over them as long as possible, if the nights should be frosty, which will greatly forward your plants; but you must not let your glasses remain upon them in very hot sun-shine, especially if their leaves press against the sides of the glasses; for it hath often been observed in such cases, that the moisture which hath risen from the ground, together with the perspiration of the plants, which, by the glasses remaining over them, hath been detained upon the leaves of the plants, and when the sun hath shone hot upon the sides of the glasses, hath acquired such a powerful heat from the beams thereof, as to scald all their larger leaves, to the no small prejudice of the plants: nay, sometimes large quantities of plants have been so affected therewith, as never to be worth any thing after.

If your plants have succeeded well, toward the end of April some of them will begin to fruit: you must therefore look over them carefully every other day, and when you see the flower plainly appear, you must break down some of the inner leaves over it to guard it from the sun, which would make the flower yellow and unsightly if exposed thereto; and when you find your flower at its full bigness (which you may know by its outside parting as if it would run), you must then draw it out of the ground, and not cut them off, leaving the stalk in the ground, as is by some practised; and if they are designed for present use, you may cut them out of their leaves; but if designed to keep, you should preserve their leaves about them, and put them into a cool place; the best time for pulling them is in a morning, before the sun hath exhauled the moisture; for cauliflowers pulled in the heat of the day, lose that firmness which they naturally have, and become tough.

But to return to our second crop (the plants being raised and managed as was directed for the early crop, until the end of October), you must then prepare some beds, either to be covered with glass-frames, or arched over with hoops, to be covered with mats, &c. These beds should have some dung laid at the bottom, about six inches or a foot thick, according to the size of your plants; for if they are small, the bed should be thicker of dung to bring them forward, and *vice versa*; this dung should be beat down close with a fork, in order

Brafica.

to prevent the worms from finding their way through it; then lay some good fresh earth about four or five inches thick thereon, in which you should plant your plants about two inches and a half square, observing to shade and water them until they have taken new root; but you must not keep your coverings close, for the warmth of the dung will occasion a large damp in the bed, which, if pent in, will greatly injure the plants. When your plants have taken root, you must give them as much free open air as possible, by keeping the glasses off in the day-time as much as the weather will permit; and in the night, or at such times as the glasses require to be kept on, raise them up with props to let in fresh air, unless in frosty weather; at which time the glasses should be covered with mats, straw, pease-haulm, &c. but this is not to be done but in very hard frosts; you must also observe to guard them against great rain, which in winter time is very hurtful to them, but in mild weather, if the glasses are kept on, they should be propped to admit fresh air; and if the under leaves grow yellow and decay, be sure to pick them off: for if the weather should prove very bad in winter, so that you should be obliged to keep them close covered for two or three days together, as it sometimes happens, these decayed leaves will render the inclosed air very noxious; and the plants perspiring pretty much at that time, are often destroyed in vast quantities.

In the beginning of February, if the weather be mild, you must begin to harden your plants by degrees, that they may be prepared for transplantation: the ground where you intend to plant your cauliflowers out (which should be quite open from trees, &c. and rather moist than dry), having been well dunged and dug, should be sown with radishes a week or fortnight before you intend to plant out your cauliflowers: the sowing of radishes is particularly mentioned, because if there are not some radishes amongst them, and the month of May should prove hot and dry, as it sometimes happens, the fly will seize your cauliflowers, and eat their leaves full of holes, to their prejudice, and sometimes their destruction; whereas, if there are radishes upon the spot, the flies will take to them, and never meddle with the cauliflowers so long as they last: indeed, the gardeners near London mix spinach with their radish-seed, and so have a double crop; which is an advantage where ground is dear, or where persons are straitened for room; otherwise it is very well to have only one crop amongst the cauliflowers, that the ground may be cleared in time.

Your ground being ready and the season good, about the middle of February you may begin to plant out your cauliflowers: the distance which is generally allowed by the gardeners near London (who plant other crops between their cauliflowers to succeed them, as cucumbers for pickling, and winter cabbages) is every other row four feet and a half apart, and the intermediate rows two feet and a half, and two feet two inches distance in the rows; so that in the latter end of May or beginning of June (when the radishes and spinach are cleared off), they put in seeds of cucumbers for pickling, in the middle of the wide rows, at three feet and a half apart; and in the narrow rows plant cabbages for winter use, at two feet two inches distance, so that these stand each of them exactly in the middle of the square between four cauliflower plants; and these after the cauliflowers are gone off, will have full room

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to grow, and the crop be hereby continued in a succession through the whole season.

There are many people who are very fond of watering cauliflower plants in summer, but the gardeners near London have almost wholly laid aside this practice, as finding a deal of trouble and charge to little purpose; for if the ground be so very dry as not to produce tolerable good cauliflowers without water, it seldom happens that watering of them makes them much better; and when once they have been watered, if it is not constantly continued, it had been much better for them if they never had any; as also, if it be given them in the middle of the day, it rather helps to scald them: so that, upon the whole, if care be taken to keep the earth drawn up to their stems, and clear them from every thing that grows near them, that they may have free open air, you will find that they will succeed better without than with water, where any of these cautions are not strictly observed.

But in order to have a third crop of cauliflowers, you should make a slender hot-bed in February, in which you should sow the seeds, covering them a quarter of an inch thick with light mould, and covering the bed with glass-frames. When the plants are come up, and have gotten four or five leaves, you should prepare another hot-bed to prick them into, which may be about two inches square; and in the beginning of April harden them by degrees, to fit them for transplanting, which should be done the middle of that month, at the distance directed for the second crop, and must be managed accordingly: these (if the soil is moist where they are planted, or the season cool and moist) will produce good cauliflowers about a month after the second crop is gone, whereby their season will be greatly prolonged.

There is also a fourth crop of cauliflowers, which is raised by sowing the seed about the 23^d of May; and being transplanted, as hath been before directed, will produce good cauliflowers in a kindly season and good soil after Michaelmas, and continue through October and November, and, if the season permit, often a great part of December.

Qualities,
&c.

All the species of cabbage are supposed to be hard of digestion, to afford little nourishment, and to produce flatulencies, though probably on no very good foundation. They tend strongly to putrefaction, and run into this state sooner than almost any other vegetable; when putrefied, their smell is likewise the most offensive, greatly resembling that of putrefied animal substances. A decoction of them is said to loosen the belly. Of all these plants cauliflower is reckoned the easiest of digestion. The white is the most fetid, and the red most emollient or laxative; a decoction of this last is recommended for softening acrimonious humours in some disorders of the breast, and in hoarseness. The red cabbage is chiefly used for pickling. In some countries they bury the white cabbage when full grown in the autumn, and thus preserve it all winter. The Germans cut them to pieces, and, along with some aromatic herbs and salt, press them close down in a tub where they soon ferment, and are eaten under the name of *Sour-craut*. See that article.

BRASSICAVIT, or BRACHICAVIT, in the menage, is a horse whose fore-legs are naturally bended archwise: being so called by way of distinction from an

arched horse, whose legs are bowed by hard labour.

BRAULS, Indian cloths with blue and white stripes. They are otherwise called *turbants*, because they serve to cover those ornaments of the head, particularly on the coast of Africa.

BRAUN (George), in Latin *Braunius*, archdeacon of Dortmund, and dean of Notre Dame in Gräbhus, at Cologne. He published a Latin oration against the priests guilty of fornication; he also wrote the Life of Jesus Christ, that of the Holy Virgin, and a controversial treatise against the Protestants; but his chief work is the *Theatrum Urbium*, in several volumes folio.

BRAUNA, a town of Germany, in Bavaria, seated on the river Inn. It has a strong fortress: notwithstanding, it was taken by the Austrians in 1743. E. Long. 13. 3. N. Lat. 48. 10.

BRAUNSBURG, a town of Poland, in Regal Prussia, with a very commodious harbour, and belonging to the king of Prussia. It is seated near the Baltic sea, in E. Long. 20. 0. N. Lat. 54. 15.

BRAUNSFELD, a town of Germany, in the circle of the Upper Rhine, and country of Solmes, with a handsome palace or castle. E. Long. 8. 32. N. Lat. 50. 22.

BRAVO, one of the Cape de Verd islands on the coast of Africa, remarkable for its excellent wines, and inhabited by Portuguese. The land is very high, and consists of mountains which look like pyramids. It abounds in Indian corn, gourds, water-melons, potatoes, horser, asses, and hogs. There is also plenty of fish on the coast, and the island produces salt-petre. W. Long. 25. 35. N. Lat. 14. 0.

BRAVO, a town of Africa, on the coast of Ajan, with a pretty good harbour. It is an independant place, and is about 80 miles distant from Magadoxo. E. Long. 41. 35. N. Lat. 1. 0.

BRAURONIA, in Grecian antiquity, a festival in honour of Diana, furnished *Brauronia*, from its having been observed at Brauron, an Athenian borough. This festival was celebrated once in five years, being managed by ten men, called in Greek [*iεροποιοι*]. The victim offered in sacrifice was a goat, and it was customary for certain men to sing one of Homer's Iliads. The most remarkable persons at this solemnity were young virgins, habited in yellow gowns, and consecrated to Diana. It was unlawful for any of them to be above ten or under five years of age.

BRAWN, the flesh of a boar fowled or pickled: for which end the boar should be old; because the older he is, the more horny will the brawn be.—The method of preparing brawn is as follows: The boar being killed, it is the slices only, without the legs, that are made brawn; the bones of which are to be taken out, and then the flesh sprinkled with salt, and laid in a tray, that the blood may drain off: Then it is to be salted a little, and rolled up as hard as possible. The length of the collar of brawn, should be as much as one side of the boar will bear, so that when rolled up it will be nine or ten inches diameter.

The collar being thus rolled up, is to be boiled in a copper, or large kettle, till it is so tender, that you can run a straw through it; then set it by, till it is thorough cold, and put it into the following pickle. To every gallon of water, put a handful or two of salt, and as much wheat-bran: Boil them together, then

Bray,
Brayle.

then drain the bran as clear as you can from the liquor; and when the liquor is quite cold, put the bran into it.

BRAY (Sir Reginald), a celebrated architect and politician, was the second son of Sir Richard Bray, one of the privy-council to king Henry VI. Sir Reginald was instrumental in the advancement of king Henry VII. to the throne of England; and was greatly in the favours of that prince, who bestowed honours and wealth upon him. His skill in architecture appears from Henry VII.'s chapel at Westminster, and the chapel of St George at Windsor, as he had a principal concern and direction in the building of the former, and the finishing and bringing to perfection the latter, to which he was also a liberal benefactor. In the middle of the fourth aisle of the above chapel, is a spacious chapel built by him, and still called by his name. He died in 1501; and was interred in the above chapel, probably under the stone where lies Dr Waterland; for, on opening the vault for that gentleman, who died in 1740, a leaden coffin of ancient form was found, which, by other appearances, was judged to be that of Sir Reginald, and was, by order of the dean, immediately arched over.

BRAY (Dr Thomas), an eminent, learned, and pious divine, was born at Marton, in Shropshire, in the year 1656, and educated at Oxford. He was at length presented to the vicarage of Over-Whitacre, in Warwickshire; and, in 1690, to the rectory of Sheldon, where he composed his *Catechetical Lectures*; which procured him such reputation, that Dr Compton, bishop of London, pitched upon him as a proper person to model the infant church of Maryland, and establish it upon a solid foundation, and for that purpose he was invested with the office of commissary. He now engaged in several noble undertakings. He procured sums to be raised for purchasing small libraries for the use of the poor ministers in the several parts of our plantations; and the better to promote this design, he published two books; one entitled *Bibliotheca parochialis*, or a scheme of such theological and other heads as seem requisite to be perused or occasionally consulted by the clergy, together with a catalogue of books which may be profitably read on each of those points; the other, *Apostolical charity*, its nature and excellency considered. He endeavoured to get a fund established for the propagation of the gospel, especially among the uncultivated Indians; and by his means a patent was obtained for erecting the corporation called *The Society for the Propagation of the Gospel*. He, by his industry, procured relief for prisoners; and formed the plan for the society for the reformation of manners, charity-schools, &c. He wrote, 1. his *Martyrology*, or *Palpal usurpation*, in one volume folio; 2. *Directorium missionarium*; and other works. This excellent man died in 1730, aged 73.

BRAY, a port-town of Ireland, in the county of Wicklow, and province of Leinster, seated on St George's channel, eight miles south of Dublin. W. Long. 6. 16. N. Lat. 53. 8.

BRAY sur Seine, a town of France, in Champagne, and in Senonais, on the confines of Brice. E. Long. 2. 15. N. Lat. 48. 35.

BRAYLE, among sportsmen, a piece of leather slit to put upon the hawk's wing, to tie it up.

BRAZED, in heraldry, a term serving to describe three chevrons, one clasping another.

BRAZEN, something consisting of brass, or formed out of it. See BRASS.

BRAZEN Age. See AGE.

BRAZEN Dish, among miners, is the standard by which the other dishes are gauged, and is kept in the king's hall.

BRAZEN Sea, in Jewish antiquity, one of the sacred utensils in the temple of Solomon. It was cast in the plain of Jordan, and removed from thence into the inner court of the temple; where it was placed upon 12 oxen, three of which looked towards each quarter of the world. It was ten cubits from the one brim to the other, five cubits in height, and 30 cubits in circumference, and contained 3000 baths. The brim of it was perfectly round, and so it continued in the two upper cubits; but, below the brim, in the three lower cubits, it was square. It was a hand-breadth thick, and the brim was wrought like the brim of a cup, with flowers of lilies. About the body of this huge vessel there were two borders of engravings, being the heads of oxen in demi-relief; out of which some suppose the water issued, and that they were made as cocks and conveyances for that purpose.—This brazen or molten sea, was designed for the priests to wash themselves in, before they performed the service of the temple. The supply of water was through a pipe out of the well Etam; though some are of opinion, that it was constantly supplied with water by the Gibeonites.

BRAZIER, an artificer who makes and deals in all kinds of brass ware. This trade, as exercised in Britain, may be reckoned a branch of the smithery, though they seldom keep forges, except for brazing or folding, and tinning the insides of their vessels, which they work up chiefly out of copper and brass prepared rough to their hands. They consist of a working part, and a shop-keeping part, which latter many carry on to a great extent, dealing as well in all sorts of iron and steel, as copper and brass goods for household furniture; and lately have fallen much into selling what is called *French plate*, made of a sort of white metal, silvered and polished to such a degree that the eye cannot soon distinguish it from real silver.

BRAZIL. See BRASIL.

BRAZING, the folding or joining two pieces of iron together by means of thin plates of brass, melted between the pieces that are to be joined. If the work be very fine, as when two leaves of a broken fan are to be brazed together, they cover it with pulverized borax, melted with water, that it may incorporate with the brass powder, which is added to it: The piece is then exposed to the fire without touching the coals, and heated till the brass is seen to run.

BRAZING is also the joining two pieces of iron together by beating them hot, the one upon the other, which is used for large pieces by farriers, &c.

BRAZZA, a town and island on the coast of Dalmatia, in the gulph of Venice, opposite to Spalatto, and subject to Venice. E. Long. 28. 0. N. Lat. 43. 0.

BREACH, in a general sense, denotes a break or rupture in some part of a fence or inclosure, whether owing to time or violence.—Inundations, or overflowings of lands, are frequently owing to breaches in the dikes or sea-banks. Dagenham breach is famous; it

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Brach.

was made in 1707, by a failure of the Thames wall in a very high tide. The force wherewith it burst in upon the neighbouring level tore up a large channel or passage for water 100 yards wide, and in some places 20 feet deep, by which a multitude of subterraneous trees that had been buried many ages before were laid bare.

BREACH, in fortification, a gape made in any part of the works of a town by the cannon or mines of the besiegers, in order to make an attack upon the place. To make the attack more difficult, the besieged fow the breach with crow-feet, or stop it with chevaux de frize.—A practicable breach, is that where the men may mount and make a lodgment, and ought to be 15 or 20 fathoms wide. The besiegers make their way to it, by covering themselves with gabions, earth-bags, &c.

BREACH, in a legal sense, is where a person breaks through the condition of a bond or covenant; on an action upon which, the breach must be assigned: And this assignment must not be general, but particular, as, in an action of covenant for not repairing houses, it ought to be assigned particularly what is the want of reparation; and in such certain manner, that the defendant may take an issue.

BREAD, a mass of dough kneaded and baked in an oven. See **BAKER**, **BAKING**, and **BARM**.

Macquer's
Chem. Dict.

The grains of all vegetables are almost entirely composed of substances very proper for the nourishment of animals; and amongst grains those which contain a farinaceous matter are the most agreeable and most nutritious.

Man, who appears to be designed by nature to eat of all substances which are capable of nourishing him, and still more of vegetables than animals, has, from time immemorial, and in all parts of the earth, used farinaceous grains as the principal basis of his food: but as these grains cannot be without difficulty eaten by men in their natural state, this active and intelligent animal has gradually found means not only to extract the farinaceous part, that is, the only nutritive part of these grains, but also to prepare it so that it becomes a very agreeable and wholesome aliment, such as the bread we now generally eat.

Nothing appears so easy at first sight as to grind corn, to make a paste with the flour and water, and to bake this paste in an oven. They who are accustomed to enjoy the advantages of the finest human inventions, without reflecting on the labour it has cost to complete them, think all these operations common and trivial. However, it appears very certain, that for a long time men no otherwise prepared their corn than by boiling and forming compact viscous cakes, not very agreeable to the taste, and of difficult digestion, before they were able to make bread of good taste and quality, as we have now. It was necessary to invent and complete ingenious machines for grinding corn, and separating the pure flour with little trouble and labour; and that inquiries, or rather some happy chance, which some observing person availed himself of, should discover, that flour mixed with a certain quantity of water is susceptible of a fermentation, which almost entirely destroys its viscosity, heightens its taste, and renders it proper to make a light bread, very agreeable to the taste, and of easy digestion.

This essential operation, on which the good quality

of bread depends, is entirely of the province of chemistry. It would add to the honour of the ancient cultivators of chemistry, to attribute to them so useful and important a discovery; but, unhappily, it is too probable that they had no share in it. The ancient chemists were engaged in other pursuits than that of bread and other common objects. They hoped to make gold; and what is bread in comparison with gold?

However that be, to the fortunate invention of raising the paste before baking we owe the perfection of the art of making bread. This operation consists in keeping some paste or dough, till by a peculiar spirituous fermentation it swells, rarefies, and acquires a smell and taste quick, pungent, spirituous, somewhat sour, and rather disagreeable. This fermented dough is well worked with some fresh dough, which is by that mixture, and moderate heat, disposed to a similar but less advanced fermentation than that above-mentioned. By this fermentation the dough is attenuated, and divided; air is introduced into it, which, being incapable of disengaging itself from the tenacious and solid paste, forms in it small cavities, raises and swells it: hence the small quantity of fermented paste which disposes the rest to ferment, is called *leaven*, from the French word *lever*, signifying to raise.

When the dough is thus raised, it is in a proper state to be put into the oven; where, while it is baked, it dilates itself still more by the rarefaction of the air, and of the spirituous substance it contains, and it forms a bread full of eyes or cavities, consequently light, and entirely different from the heavy, compact, viscous, and indigested masses made by baking unfermented dough.

The invention of beer, or wine of grains, furnishes a new matter useful in the making of bread. This matter is the froth which forms upon the surface of these liquors during fermentation. When it is mixed with dough, it raises it better and more quickly than ordinary leaven. It is called *yeast* or *barm*. By means of this, the finest, lightest bread is made. It often happens, that bread made with leaven dough has a sourish and not agreeable taste; which may proceed from too great a quantity of leaven, or from leaven in which the fermentation has advanced too far. This inconvenience does not happen to bread made with yeast; because the fermentation of this substance is not too far advanced, or because more attention is given to that finer bread.

It may be asked, Why, since dough is capable of fermenting spontaneously and singly, as we see from the leaven, a substance is added to dispose it to ferment? The true reason is, That all the parts of a fermenting substance do not ferment at the same time, nor to the same degree; so that some parts of this substance have finished their fermentation, while others have not yet begun. The fermentable liquors which contain much sugar, as hydromel, and must of wines, give proofs of this truth; for, after these liquors have become very vinous, they have still very distinctly a saccharine taste: but all saccharine matter is still susceptible of fermentation; and, in fact, if vinous hydromel, or must, or even new beer, be distilled, so that all their ardent spirit shall be separated, and the residuums diluted with water, we shall see a second fermentation take place, and a new quantity of ardent spirit formed.

The

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The same thing precisely happens to dough, and still more sensibly, from its viscosity and want of fluidity; so that if it be left to ferment alone, and without the help of leaven, as the fermentation proceeds very slowly and successively, the parts which ferment first will have become sour and rapid before all the rest be sufficiently attenuated and changed, by which the bread will acquire a disagreeable taste.

A mixture of a small quantity of leaven with dough effectually prevents this inconvenience; because the effect of this leaven, and of all fermenting substances, is to dispose to a similar fermentation all matters capable of it, with which it is mixed; or rather, by means of leaven, the fermentation of all the parts of such substances is effected more nearly at the same time.

Bread well raised and baked differs from unfermented bread, not only in being less compact, lighter, and of a more agreeable taste, but also in being more easily miscible with water, with which it does not form a viscous mass, which circumstance is of great importance in digestion.

Calien on the
Mat. Med.

It is observable, that without bread, or somewhat of this form, no nation seems to live. Thus the Laplanders, having no corn of their own, make a sort of bread of their dried fishes, and of the inner rind of the pine, which seems to be used, not so much for their nourishment, as for supplying a dry food. For this mankind seem to have an universal appetite, rejecting bland, slippery, and mucilaginous foods. This is not commonly accounted for, but seems to depend on very simple principles. The preparation of our food depends on the mixture of the animal fluids in every stage. Among others the saliva is necessary, which requires dry food as a necessary stimulus to draw it forth, as bland, slippery, fluid aliments are too inert, and make too short stay in the mouth, to produce this effect, or to cause a sufficient degree of mastication to emulge that liquor. For this reason we commonly use dry bread along with animal food, which otherwise would be too quickly swallowed. For blending the oil and water of our food nothing is so fit as bread, assisted by a previous mastication. For which purpose, bread is of like necessity in the stomach, as it is proper that a substance of solid consistence should be long retained there. Now the animal fluids must be mixed with our aliments, in order to change the accefcency it undergoes. But liquid foods would not attain this end, whereas the solid stimulates and emulges the glands of the stomach. The bread then appears to be exceedingly proper, being bulky without too much solidity, and firm without difficulty of solution.

Among the ancients we meet with various denominations of bread; as, 1. *Panis siliginus*, called also *mundus*, *athleticus*, *isungia*, *coliphus*, and *robys*, answering to our white bread; being made of the purest flour of the best wheat, and only used by the richer sort. 3. *Panis secundus* or *secundarius*, called also *smilaceus* or *smilaginaceus*, the next in purity; being made of fine flour, only all the bran not sifted out. 2. *Austopyrus*, called also *syncomstus* and *confusaneus*, made of the whole substance of the wheat, without either retrenching the finer flour or coarser bran; answering to our household bread. 4. *Cacabaceus*, apparently the same with what was otherwise denominated *fordidus*, as being given to dogs; *surfuraceus*, *surfurcus*, or *sur-*

furatus, because made in great part of bran; and, in the middle age, *biffus*, on account of its brownness; sometimes also *leibo*. There were other sorts of bread, denominated from the manner in which they were made, or the uses they were applied to; as, 1. *The militaris*, which was prepared by the soldiers and officers in camp with their own hands; for which purpose some had hand-mills, others pounded the corn in a mortar, and baked it on the coals. 2. *Glibanites*, that baked in an oven, by way of contradistinction from that baked on the hearth or under the embers. 3. That called *subcineritius*, or *sub cinere coctus*; sometimes also *reverfatus*, because it was to be turned in the baking. 4. *Nauticus*, answering to our sea-biscuit, and denominated accordingly *bis coctus*, because baked several times over to make it keep the longer. Other kinds of bread were denominated from their qualities and accidents; as, 1. *The panis ficcus*, that which had been long baked; such as were the *bis coctus*, naval and buccellated bread. 2. *Madidus*, a sort made of rye or bear, sometimes also made of fine flour, wherewith they smeared their faces, by way of a cosmetic, to render them smooth. 3. *Acidus*, or sour bread, which was acidulated with vinegar. 4. *Azymus*, that unleavened or unfermented.

The French have also a great variety of breads; as queca's bread, *alamode* bread, bread de Segovic, de Gentilly, quality-bread, &c. all prepared in peculiar manners by the bakers of Paris. The bread de Gonneffe excels all others, on account of the waters at Gonneffe, a town three leagues from Paris. It is light, and full of eyes, which are the marks of its goodness. *Pain de ménage*, is that which each family bakes for itself. Spice-bread, *pain d'épice*, denotes bread baked and iced over with the scum taken off sugar in refining houses; it is sometimes also made with honey and other sorts of seasoning, and answers to what the ancients call *panis mellitus*.

Among us, bread is chiefly divided into white, wheaten, and household; differing only in degrees of purity. In the first, all the bran is separated; in the second, only the coarser; in the third, none at all: so that fine bread is made only of flour; wheaten bread, of flour and a mixture of the finer bran; and household, of the whole substance of the grain, without taking out either the coarse bran or fine flour. We also meet with *symmel* bread, *manchet* or *roll* bread, and French bread: which are only so many denominations of the finest and whitest bread, made of the purest flour; except that in roll-bread there is an addition of milk; and in French bread, of eggs and butter also. In Lancashire, and several of the northern counties of England, they have several sorts of oat bread; as, 1. The bannock, which is an oat-cake, kneaded only with water, and baked on the embers. 2. Clap-bread, which is made into thin hard cakes. 3. Bitchins bread, which is made of thin batter, and made into thin soft oat-cakes. 4. Riddle-cakes, which are thick and sour, have but little leaven, and are kneaded stiff. And, 5. Jannock, which is oat bread made up into loaves. Add to these, *pease-bread*, much used in many parts of Scotland; being bread consisting either wholly of the flour of pease, or of this and oat-meal mixed: the dough, sometimes leavened, sometimes made only with water, is formed either into bannocks or cakes, and baked over the embers; or into what they call *baps*, i. e. a kind

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Suppl. to
Chemical
Dict.

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of flattish rolls, and baked in the oven. In the statute of assize of bread and ale, 51 Hen. III. mention is made of wastel-bread, cocket-bread, and bread of treet; which answer to the three kinds of bread now in use, called *wabite*, *wheatens*, and *household bread*. In religious houses, they heretofore distinguished bread by the names *Elquires bread*, *panis armigerorum*; monks bread, *panis conventualis*; boys bread, *panis puerorum*; and servants bread, *panis famulorum*, called also *panis servientalis*. A like distribution obtained in the households of nobles and princes; where, however, we find some other denominations; as, messengers bread, *panis nunciarius*, that given to messengers as a reward of their labour; court bread, *panis curialis*, that allowed by the lord for the maintenance of his household; eleemosynary bread, that distributed to the poor by way of alms.

It is for the interest of the community that the food of the poor should be as various as possible, that, in times of dearth and scarcity of the ordinary kinds, they may not be without ready and cheap resources. To the discovery of such resources several benevolent philosophers having successfully turned their inquiries, we shall lay before the reader the result of their experiments.

1. BREAD of Potatoes *. Potatoes, previously deprived of their skin, cut into thin slices, and put between paper, will dry in a heat somewhat less than 35° of Reaumur's thermometer; and, when thus dried, they will preserve their white colour. By this process they lose about two thirds of their weight, and they may then be reduced to a fine powder. A little of this powder thrown upon the fire sends out a smoke, accompanied with a smell resembling burnt bread. As this smell is perceived from all farinaceous vegetables when treated in the same manner, Mr Parmentier thinks it may be considered as the characteristic of the presence of an amylaceous * matter. This smell does not, however, he observes, arise from the amylaceous or fibrous part separately, but from both taken together. The powder of potatoes, obtained in the manner described above, has the smell and taste of wheat; and, like it, is devoured by rats and mice: but, even when most finely powdered, it has not the feel or brightness of the flour of wheat; although, on a chemical analysis, it yields the same products. It is also nutritious, and keeps well for a long time.

Finding so great a similarity between the meal of wheat and what may be called the meal of potatoes, Mr Parmentier next endeavoured to make bread of them when mixed in different proportions. His trials were made with one fourth, one third, one half, and two thirds, of the potato-meal, the remainder being flour from wheat. These proportions, with the addition of a little salt and yeast, yielded bread which was well tasted, but which had fermented little, was brown, and covered with hard brown crusts. Bread made from the meal of potatoes alone, with the addition of salt and yeast, was eatable, but very heavy, unfermented, and exceedingly brown. This bread, from the meal of potatoes alone, was apt to crumble into powder. To give it more adhesion, he mixed with the meal a decoction of bran, or a mixture of honey and water; either of which made it lighter and more fermented: it obtained also a crust of a golden colour, became well tasted, and sufficiently adhesive. Mr Parmentier obtained bread

also, well fermented, and of a good colour and taste, from a mixture of raw potato-pulp with meal of wheat, or potato-meal, with the addition of yeast and salt.

Potatoes, when used for making bread, are not readily disposed to ferment; without which, bread is very insipid, and not easily digested. But Mr Parmentier found, from a variety of experiments, that good bread might be made from equal quantities of flour and potato-meal. He concludes, therefore, with recommending the mixture of potatoes, in times of scarcity, with the flour of wheat, instead of employing rye, barley, or oats, as has frequently been done.

When grain is altogether wanting, he recommends the use of bread made from a mixture of the amylaceous powder of potatoes and of their pulp, this mixture being fermented with leaven, or with honey. The meal of this root, when diluted with hot water, acquires a tenacious and gluey consistence. However fair the meal of potatoes may be, it always gives a grey colour to the bread made by mixing it with the flour of wheat: but a mixture of the pulp of potatoes with the flour of wheat does not produce brown-coloured bread.

Mr Parmentier made bread, very much like that of wheat, by a mixture of the following four substances, viz. four ounces of amylaceous powder of potatoes, one dram of mucilage extracted from barley, one dram of the bran of rye, and a dram and a half of glutinous matter dried and powdered.

2. BREAD from different Vegetables not commonly in Use *. Although horse-chestnut has not hitherto been employed, yet it is certain that wholesome bread, without any bitterness, may be obtained from it. Mr Parmentier advises, that the fruit, after the skin is taken off, and the juice pressed from it, be made into a paste. This mass must be diluted in water, and then strained through a sieve. A milky-coloured liquor is thus separated, which, on standing, deposits a fine powder. This, being dried, is without either smell or taste, and very fit for aliment; the mass from which it is procured retaining the bitterness of the fruit.

The roots of the bryonia, when treated in the same manner, yielded a similar white powder. By the same treatment also, fine, white, insipid, inodorous powders may be procured from the roots of the iris, gladiolus, ranunculus, fumaria, arum, dracunculus, mandragora, colchicum, filipendula, and helleborus; plants which grow spontaneously, and in great abundance.

Of acorns bread has frequently been made; and to this day, in some countries, they are in common use. The method of preparation which Mr Parmentier recommends, is, that they be deprived of their cover by boiling, then dried and powdered, and afterwards baked in the same manner as the flour of wheat. When fully ripe, and made into a paste, they were deprived of their atringency by merely pressing their juice from them. The mass remaining after the pressure, when dried, was easily reduced to a fine powder by no means disagreeable.

The gramin caninum arvense, in its appearance, approaches to corn; and some naturalists have considered it as the original species from which all our grain is produced. Its roots are sweet-tasted, and have long been employed in making pifans. In the preparation of them for bread, it is only necessary that the roots should be cleansed, cut small, dried, and pounded. This

powder,

Bread.

* From *Examen Chimique des Pommes de Terre*, &c. par M. Parmentier, apoth. major del hotel des invalides, Paris.

* See the note infra.

* From *Mémoire sur les végétaux qui pourroient suppléer en temps de disette de ceux que l'on emploie communément à la nourriture des hommes*, &c. par M. Parmentier.

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powder, Mr Parmentier observes, does not dissolve in cold water or spirits; but it does in boiling water, which it renders thick and cloudy, and, upon cooling, the whole mass obtains a gelatinous confluence. Upon a chemical analysis, it yields an acid empyreumatic oil, which possesses a singular odour, resembling that which is perceived on burning the plant. The spongy residuum, calcined in the air, gives a fixed alkali. These properties incontestably prove, that it contains an *amylaceous* (A) matter similar to that of grain, which appears to be the nutritive part of vegetables. This *amylaceous* matter, formed into a jelly, and diffused in water, keeps for a long time without suffering any change; it then turns acid, and at length putrefies.

The *amylaceous* matter of acrid and poisonous plants, although innocent and nutritive, cannot be converted into bread without the addition of some mucilaginous substance. In times of great scarcity, common bran will answer the purpose: but when potatoes are to be had, the addition of a proper proportion of these is to be preferred.

Mr Parmentier gives an account of the bread which he obtained from the *amylaceous* powders of the different vegetables mentioned above, with the addition of potatoes and a small quantity of common leaven of grain. This bread appeared in general to be well fermented; it was of a good white colour, and free from any disagreeable odour: but to the taste it was somewhat insipid; which, however, he imagines, might have been corrected by the addition of a proper quantity of salt.

As the resources against scarcity here pointed out can be procured only at particular seasons, the author proposes a method for preserving the matter thus obtained. For this purpose, he advises, that bread prepared in the manner mentioned above should be carefully dried, reduced to powder, and then kept in a close cask. By this means, he is of opinion that it may be preserved for a very long time, and will always be ready to make an agreeable and wholesome panada by the addition of a little butter and salt.

Mr Parmentier, in order to discover the degree of power wherewith this alimentary powder nourished, made himself the subject of experiment; and found, that three ounces of it for dinner, and as much for supper, made into panada with water, was a sufficient

quantity of aliment for a day. From his discharge by stool while he used it, he had reason to believe that it is almost totally alimentary. He concludes with recommending it not only as useful in times of scarcity, but as a proper substitute for sea-biscuit, and as a species of food well adapted for armies and hospitals.

3. *Cheap method of making wholesome BREAD*, when wheat-flour is dear, by mixing turnip with it.*

"At the time I tried this method, bread was very dear, inasmuch that the poor people, in the country where I live, could hardly afford themselves half a meal a day. This put me upon considering whether some cheaper method might not be found, than making it of wheat-meal. Turnips were at that time very plentiful. I had a number of them pulled, washed clean, pared, and boiled; when they became soft enough to mash, I had the greatest part of the water pressed out of them, and afterwards had them mixed with an equal quantity in weight of coarse wheat-meal; the dough was then made in the usual manner, with yeast or barm, salt, water, &c. It rose very well in the trough; and after being well kneaded, was formed into loaves, and put into the oven to be baked. I had at the same time some other bread made with common meal in the ordinary way. I baked my turnip-bread rather longer than the other. When they were drawn from the oven, I caused a loaf of each sort to be cut; and found, on examination, the turnip bread was sweeter than the other, to the full as light and as white, but had a little taste (though nowise disagreeable) of the turnip. Twelve hours afterwards I tasted my turnip-bread again, when I found the taste of the turnip in it scarce perceivable, and the smell quite gone off. On examining it when it had been baked 24 hours, had I not known that there were turnips in its composition, I should not have imagined it: it had, it is true, a peculiar sweetish taste, but by no means disagreeable; on the contrary, I rather preferred it to the bread made of wheat-meal alone. After it had been baked 48 hours, it underwent another examination, when it appeared to me to be rather superior to the other; it eat fresher and moister, and had not at all abated in its good qualities: to be short, it was still very good after a week; and, as far as I could see, kept as well as the bread made of common wheat-meal.

"In my trials of this bread by the taste, I was
8 K 2 not

(A) M. Beccari of the Bolognian academy has discovered in the flour of wheat two distinct substances. The one he terms an *animal* or *glutinous* matter; the other, an *amylaceous* matter, or *vegetable* paste.

The *gluten* has been supposed to be the nutritive part of corn, from its not dissolving easily in vegetable acids; from its assuming a spongy form in boiling water; from its supposed analogy to the animal lymph; and, lastly, from the similitude which the products it affords, on a chemical analysis, bear to those obtained from animal substances. M. Parmentier, however, from various experiments, was led to conclude, with the celebrated Doctor of Peterburg, that the *gluten* or animal matter of Beccari exists in the bran, and is not the nutritive part of the wheat. Having made experiments with four different kinds of flour, it appeared that the quantity of animal matter was always proportioned to the coarseness of the flour. Hence, were this *gluten* the nutritive part, the coarsest bread, or that which contained most bran, would afford the greatest quantity of nourishment. The contrary of this, however, is now known to be fact.

The *amylaceous* part, or, as some have termed it, the *fecula*, of wheat and other vegetables, is a peculiar gum, not soluble in spirit of wine, vinegar, or cold water. It contains more acid, and less water, than the ordinary gums. It is found in many of those plants that make the nourishment of men and other animals. Hence Mr Parmentier concludes it to be the nutritive matter.

Though we are not to consider the glutinous matter as the nutritious part of vegetables, yet it is a very necessary ingredient. It is that which preserves the cohesion of the paste in fermenting bread: it is that which forms the viscid pellicle, and stops the air in fermentation; gives the savoury taste to bread; occasions it to be light, to ferment, and which forms the small cells seen in it. It is found especially near the cortical part of grain; and this accounts for its being found in the greatest quantity in coarse brown meal. It is this *gluten* which renders wheat a superior aliment to the other grains and roots.

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* From a
letter in the
Museum Rus-
sicum et
Commerciale

Bread. not satisfied with eating it by itself; I had some of it spread with butter; I tasted it with cheese; I eat of it toasted and buttered, and finally in boiled milk and in soup: in all these forms it was very palatable and good."

BREAD in Medicine. Besides the alimentary, bread has also medical qualities.—Decoctions, creams, and jellies of bread are directed in some dispensaries. Bread carefully toasted, and infused or lightly boiled in water, imparts a deep colour, and a sufficiently agreeable refracting taste. This liquor, taken as common drink, has done good service in a weak lax state of the stomach and intestines; and in bilious vomiting and purging, or the cholera morbus: examples are related in the Edinburgh essays of several cases of this kind cured by it, without the use of any other medicine.—In Westphalia there is a very coarse bread eaten, which still retains the opprobrious name given it by a French traveller, of *Bonpournickel*, "good for his horse *Nickel*." It is the same with what the Romans called *panis furfureus*, or *panis impurus*, from its not being cleaned from the hulk; and *panis ater*, from the blackness of its colour: though we learn from Pliny, that the Romans for 300 years knew no other bread. The Germans * make two sorts of waters by distillation from this bread: the one with, the other without, the addition of a spirituous liquor: to both which great virtues are ascribed. That without any thing spirituous, is made out of the juice of craw-fish, may-dew, rose-water, nutmegs, and saffron, distilled from a large quantity of this bread. This is esteemed a great restorative, and given in hectic habits. The other is distilled from this bread and Rhenish wine, with nutmegs and cinnamon. This is given in all the disorders of the stomach, vomiting, loss of appetite, and other complaints of the same kind: and besides these, there is a spirit distilled from it by the rectory in the dry way, which, when separated from its fetid oil, is esteemed a powerful sudorific, and very valuable medicine in removing impurities of the blood.

Bread is also medicinal, applied externally, as is vulgarly known*. Mr Boyle assures us he drew a menstruum from bread stronger than aquafortis, and which would act even upon glass itself †.

BREAD-Tree, the English name of the artocarpus (B); the fruit of which not only serves as a substitute for bread among the inhabitants of O-Taheite ‡ and the neighbouring islands, but also, variously dressed, composes the principal part of their food. It grows on a tree that is about the size of a middling oak; its leaves are frequently a foot and an half long, of an oblong shape, deeply sinuated like those of the fig-tree, which they resemble in colour and consistence, and in the exuding of a milky juice upon being broken. The fruit is about the size and shape of a new-born child's head; and the surface is reticulated*, not much unlike a truffle; it is covered with a thin skin, and has a core about as big as the handle of a small knife. The eatable part lies between the skin and the core; it is as white as snow, and somewhat of the consistence of new bread; it must be roasted before it is eaten, being first divided into three or four parts; its taste is insipid, with a slight sweetness somewhat resembling that of the crumb of wheaten bread

mixed with a Jerusalem artichoke. This fruit is also cooked in a kind of oven, which renders it soft, and something like a boiled potatoe; not quite so farinaceous as a good one, but more so than those of the middling sort. Of the bread-fruit they also make three dishes, by putting either water or the milk of the cocoa nut to it, then beating it to a paste with a stone pestle, and afterwards mixing it with ripe plantains, bananas, or the four paste which they call *nahie*.

The mahie, which is likewise made to serve as a succedaneum for ripe bread-fruit before the season comes on, is thus made: The fruit of the bread-tree is gathered just before it is perfectly ripe; and being laid in heaps, is closely covered with leaves: in this state it undergoes a fermentation, and becomes disagreeably sweet; the core is then taken out entire, which is done by gently pulling out the stalk, and the rest of the fruit is thrown into a hole which is dug for that purpose generally in the houses, and neatly lined in the bottom and sides with grass: the whole is then covered with leaves and heavy stones laid upon them; in this state it undergoes a second fermentation, and becomes sour, after which it will suffer no change for many months. It is taken out of the hole as it is wanted for use; and being made into balls, it is wrapped up in leaves and baked: after it is dressed, it will keep five or six weeks. It is eaten both cold and hot; and the natives seldom make a meal without it, though to Europeans the taste is as disagreeable as that of a pickled olive generally is the first time it is eaten.

To procure this principal article of their food, (the bread-fruit), costs these happy people no trouble or labour except climbing up a tree: the tree which produces it does not indeed grow spontaneously; but if a man plants ten of them in his life-time, which he may do in about an hour, he will as completely fulfil his duty to his own and future generations, as the native of our less temperate climate can do by ploughing in the cold of winter, and reaping in the summer's heat, as often as these seasons return; even if, after he has procured bread for his present household, he should convert a surplus into money, and lay it up for his children.

Bees-BREAD. See APIS, n° 12, par. ult.

Cassada-BREAD. See JATROPHA.

Earth BREAD*. "In the lordship of Moscow in the Upper Lusatia, a sort of white earth is found, of which the poor, urged by the calamities of the wars which raged in those parts, make bread. It is taken out of a hill where they formerly worked at saltpetre. When the sun has somewhat warmed this earth it cracks, and small white globules proceed from it as meal; it does not ferment alone, but only when mixed with meal. Mr Sarlitz, a Saxon gentleman, was pleased to inform us, that he has seen persons who in a great measure lived upon it for some time. He assures us that he procured bread to be made of this earth alone, and of different mixtures of earth and meal; and that he even kept some of this bread by him upwards of six years: he further says, a Spaniard told him, that this earth is also found near Geronne in Catalonia."

Eucharist or Sacramental BREAD, in the Protestant churches, is common leavened bread, in conformity to the ancient practice. In the Romish mass, azymous or unleavened

Bread.

* Hoffman
Objer. Chem.

* Boyle's
Phil. Works
abridged,
vol. III.
p. 572.
† Ibid. vol. I.
p. 34. 49.

‡ Hawkesworth's account of
Capt. Cook's voyage.

* See Plate
LVIII.
fig. 3. But
delete what
is there written
concerning
the size.

* From the
German K-
phenersches,
1764.

(B) A new genus of plants; so named from *αρτος* (*panis*) "bread," and *καρπος* (*fructus*) "fruit," and referred to the monoclea monogynia of Linnæus. [Forsteri Characteres, 51].

Bread.

unleavened bread is used, particularly in the Gallican church, where a sort is provided for this purpose called *pain a chanter*, made of the purest wheaten flour pressed between two iron plates graven like wafer-moulds, being first rubbed with white wax to prevent the paste from sticking. The Greeks observe divers ceremonies in their making the eucharist bread. It is necessary the person who bakes it have not lain with his wife the day before; or, if it be a woman, that she have not conversed with her husband. The Abyssinians have an apartment in their churches for this service, being a kind of sacristy. F. Sirmond, in his disquisition on azymous bread, shews from the council of Toledo, that anciently there were as many ceremonies used in the Latin church in the preparation of their unleavened bread as are still retained in the eastern churches. He cites the example of Queen Radeconda, who distributed with her own hands, in the church, the bread which she herself had made. It appears also from the dispute of cardinal Humbert against the Greeks, that in the Latin church no bread was used for the eucharist, but what was taken out of the sacristy, and had been made by the deacons, subdeacons, and even priests, who rehearsed several psalms during the process.

Ecclesiastical writers enumerate other species of bread allotted for purposes of religion; as, 1. *Calendarius*, that anciently offered to the priest at the calends. 2. *Prebendarius*, the same with *capitularis*, that distributed daily to each prebendary or canon. 3. *Benedictus*, that usually given to catechumens before baptism, in lieu of the eucharistic bread, which they were incapable of partaking of. The *panis benedictus* was called also *panagium* and *eulogium*, being a sort of bread blessed and consecrated by the priest, whereby to prepare the catechumens for the reception of the body of Christ. The same was used afterwards, not only by catechumens, but by believers themselves, as a token of their mutual communion and friendship. Its origin is dated from the 7th century, at the council of Nantz. In the Gallican church we still find *panis benedictus*, *pain benit*, used for that offered for benediction, and afterwards distributed to pious persons who attend divine service in chapels. 4. Consecrated bread is a piece of wax, paste, or even earth, over which several ceremonies have been performed with benedictions, &c. to be set in an *Agnus Dei*, or relic-box, and presented for veneration. 5. Unleavened bread, *panis azymus* †. The Jews eat no other bread during their passover; and exact search was made in every house, to see that no leavened bread was left. The usage was introduced in memory of their hasty departure from Egypt, when they had not leisure to bake leavened. 6. Shew-bread was that offered to God every sabbath-day, being placed on the golden table in the holy of holies.

Horfe Bread is made of wheat, oats, and beans; to which sometimes are added aniseed, gentian, liquorice, fenugreek, eggs, and ale; and sometimes rye and white wine are used.

For race-horses three sorts of bread are usually given with success, for the second, third, and fourth nights feeding: they are all made of beans and wheat worked with barm; the difference consisting chiefly in the proportion of the two former. In the first kind, three times the quantity of beans is used to one of wheat; in the second, equal quantities of both; in the third, three

times the quantity of wheat to one of beans.

Sago Bread. See SAGO.

Assize † of Bread. The price and weight of bread is regulated by the magistrates according to the price of wheat. We have divers tables of the weights of the loaves both of white, wheaten, and household bread, at every price of wheat. If bread want one ounce in 36, the baker formerly was to suffer the pillory: now, to forfeit 5s. for every ounce wanting; and for every defect less than an ounce, 2s. 6d.; such bread being complained of and baked before a magistrate within 24 hours after it is baked or exposted to sale within the bills of mortality, or within three days in any other place. It is to be observed, bread loses weight by keeping: in some experiments recited by Bartholine, the diminution was near one fourth in six months. The same author assures us, that in Norway they make bread which keeps 30 or 40 years; and that they are there fonder of their old hard bread, than elsewhere of new or soft; since the older it is, the more agreeable it grows. For their great feasts, particular care is taken to have the oldest bread; so that, at the christening of a child, they have usually bread which has been baked perhaps at the christening of his grandfather. It is made of barley and oat-meal baked between two hollow stones.

BREAD-ROOM, in a ship, that destined to hold the bread or bilket.

The boards of the bread-room should be jointed and caulked, and even lined with tin plates, or mats. It is also proper to warm it well with charcoal for several days before the bilket is put into it; since nothing is more injurious to the bread than moisture.

BREADTH, in geometry, one of the three dimensions of bodies, which multiplied into their length constitutes a surface.

BREAK, in a general sense, signifies to divide a thing into several parts with violence.

In the art of war, to *break ground*, is to open the trenches before a place.

Among sportsmen, to *break a horse* in trotting, is to make him light upon the hand in trotting, in order to make him fit for a gallop. To *break a horse* for hunting, is to supple him, to make him take the habit of running.

BREAKERS, a name given by sailors to those billows that break violently over rocks lying under the surface of the sea. They are distinguished both by their appearance and sound, as they cover that part of the sea with a perpetual foam, and produce a hoarse and terrible roaring, very different from what the waves usually have in a deeper bottom. When a ship is unhappily driven among breakers, it is hardly possible to save her, as every billow that heaves her upwards serves to dash her down with additional force when it breaks over the rocks or sands beneath it.

BREAKING, in a mercantile style, denotes the becoming bankrupt. See BANKRUPT.

BREAKING Bulk, in the sea-language, is the same with unloading part of the cargo.

BREAKSPEAR (Nicholas). See ADRIAN IV.

BREAM, in ichthyology. See CYPRINUS.

BREAST, in anatomy, denotes the fore-parts of the thorax. See ANATOMY, n^o 35, 373.

Smiting the breast is one of the expressions of penitence.

Bread

Bread.

† See *Assize*, par. ult.

† See *Azymus*.

Breast. tence. In the Romish church, the priest beats his breast in rehearsing the general confession at the beginning of the mass.

BREASTS, or *Mammæ*, in anatomy. See **ANATOMY**, n° 376.

* *Berthol.*
Afr. Med.
p. 171. *Caft.*
Lex. Med.
p. 718.
† Cabrol. Ob-
serv. 7.
Blaf. C. m.
ed Vefling.
p. 133.

The breasts are usually two; though we also meet with instances of *trmammiæ* or women with three breasts*, and even some with four, all yielding milk alike †.

BREAST-Hooks, in ship-building, are thick pieces of timber incurvated into the form of knees, and used to strengthen the fore-part of the ship, where they are placed at different heights directly across the stem, so as to unite it with the bows on each side. The breast-hooks are strongly connected to the stem and hawle-pieces by tree-nails, and by bolts driven from without through the planks and hawle-pieces, and the whole thickness of the breast-hooks, upon whose inside those bolts are forelocked or clinched upon rings. They are usually about one-third thicker, and twice as long, as the knees of the decks they support.

BREAST-Plate, in antiquity, a piece of armour worn to defend the breast, originally believed to be made of hides, or hemp twilted into small cords, but afterwards made of brass, iron, or other metals, which were sometimes so exquisitely hardened, as to be proof against the greatest force.

BREAST-Plate, in Jewish antiquity, one part of the priestly vestments anciently worn by the high-priests. It was a folded piece of the same rich embroidered stuff of which the *ephod* was made: and it was set with twelve precious stones, on each of which was engraven the name of the tribes. They were set in four rows, three in each row; and were divided from each other by the little golden squares or partitions in which they were set. The names of these stones, and that of the tribes engraven on them, as also their disposition on the breast-plate, are as follows.

Sardis P	Emerald TURAH.	Ligure GAD.	Jeryl. ZEBULON.
Topaz SIMEON	Opal DAN.	Agate ASHER	Onga. JOSEPH.
Carbuncle LEVI	Diamond NAPHTHALI	Amethyst ISSACHAR	Y. per. BENJAMIN.

This breast-plate was fastened at the four corners; those on the top to each shoulder by a golden hook or ring at the end of a wreath chain; and those below, to the girdle of the *ephod*, by two strings or ribbons, which had likewise two rings and hooks.

This ornament was never to be fevered from the priestly garment; and it was called the *memorial*, to put the high-priest in mind how dear those tribes ought to be to him, whose names he wore on his breast. It is also called the *breast-plate of judgment*, because it had the divine oracle of *Urim and Thummim* annexed to it. See **URIM AND THUMMIM**.

BREAST-Plate, in the menage, the strap of leather that runs from one side of the saddle to the other, over the horse's breast, in order to keep the saddle tight, and hinder it from sliding backwards.

BREAST-Work, in fortification, the same with **PALAPET**.

BREATH, the air inspired and expelled again in the action of respiration.

The ancients were very watchful over the last breath of dying persons, which the nearest relations, as the mother, father, brother, or the like, received in their mouths.

BREATHING, the same with **RESPIRATION**.

BRECHIN, a town of Scotland, in the county of Angus, situated in E. Long. 2. 18. N. Lat. 56. 40. It consists of one large handsome street, and two smaller; and is seated on the side of a small hill, washed by the river Southesk, over which there is a stone-bridge of two large arches. At the foot of the town is a long row of houses independent of it, built on ground held in feu from the family of Northesk. It is a royal borough, and, with four others, sends a member to parliament. In respect to trade, it has only a small share of the linen manufacture. It lies at no great distance from the harbour of Montrose: and the tide flows within two miles of the town; to which a canal might be made, which perhaps might create a trade, but would be of certain service in conveying down the corn of the country for exportation.

Brechin was a rich and ancient bishopric founded by David I. about the year 1150. At the Reformation, its revenues, in money and in kind, amounted to 700l. a-year; but, after that event, were reduced to 150l. chiefly by the alienation of lands and tythes by Alexander Campbell, the first Protestant bishop, to his chieftain the earl of Argyle.—The Culdees had a convent here. Their abbot Leod was witness to the grant made by king David to his new abbey of Dunfermline. In after times, they gave way to the Mathurines or Red Friars. The ruins of their house, according to Maitland, are still to be seen in the College Wynd.—Here was likewise an hospital called *Maison de Dieu*, founded in 1256, by William de Brechin, for the repose of the souls of the kings William and Alexander; of John earl of Chester, and of Huntingdon his brother; of Henry his father, and Juliana his mother. Albino bishop of Brechin, in the reign of Alexander II. was witness to the grant. By the walls which are yet standing, behind the west end of the chief street, it appears to have been an elegant little building.

The cathedral is a Gothic pile, supported by 12 pillars; is in length 166 feet, in breadth 61: part is ruinous, and part serves as the parish-church. The west end of one of the aisles is entire: its door is Gothic, and the arch consists of many mouldings; the window of it neat tracery. The steeple is a handsome tower, 120 feet high; the four lower windows in form of long narrow openings; the belfry windows adorned with that species of opening called the *quatrefoil*: the top battlemented, out of which rises a handsome spire.—At a small distance from the aisle stands one of those singular round towers whose use has so long baffled the conjectures of antiquaries. These towers appear to have been peculiar to North-Britain and Ireland: in the last they are frequent; in the former, only two at this time exist. That at Brechin stood originally detached from other buildings. It is at present joined near the bottom by a low additional aisle to the church, which takes in about a sixth of its circumference. From this aisle there is an entrance into it of modern date, approachable by a few steps, for the use of the ringers: two handsome bells

Breath
Brechin.

Pennant's
Tour in Scot-
land.

bells are placed in it, which are got at by means of six ladders placed on wooden femicircular floors, each resting on the circular abutments within side of the tower. The height from the ground to the roof is 80 feet; the inner diameter, within a few feet of the bottom, is 8 feet; the thickness of the wall at that part, 7 feet 2 inches; so that the whole diameter is 15 feet 2 inches; the circumference very near 48 feet; the inner diameter at top is 7 feet 8 inches; the thickness of the walls, 4 feet 6 inches; the circumference, 38 feet 8 inches; which proportion gives the building an inexpressible elegance: the top is roofed with an octagonal spire 23 feet high, which makes the whole 103. In this spire are four windows placed alternate on the sides, resting on the top of the tower; near the top of the tower are four others facing the four cardinal points: near the bottom are two arches, one within another, in relief; on the top of the outmoft is a crucifixion: between the mouldings of the outmoft and inner are two figures; one of the Virgin Mary; the other of St John, the cup, and lamb. On each corner of the bottom of this arch is a figure of certain beasts; one possibly the Caledonian bear; and the other, with a long snout, the boar. The stone-work within the inner arch has a small slit or peep-hole, but without the appearance of there having been a door within any modern period: yet there might have been one originally; for the filling up consists of larger stones than the rest of this curious rotund. The whole is built with most elegant masonry, which Mr Gough observed to be composed of 60 courses.—This tower hath often been observed to vibrate with a high wind.

The learned among the antiquaries are greatly divided concerning the use, as well as the founders, of these buildings. Some think them Pictish, probably because there is one at Abernethy the ancient seat of that nation; and others call them Danish, because it was a custom of the Danes to give an alarm in time of danger from high places. But the manner and simplicity of building, in early times, of both these nations, was such as to supersede that notion: besides, there are so many specimens left of their architecture, as tend at once to disprove any conjecture of that kind: the Hebrides, Caithness, and Ross-shire, exhibit relics of their buildings totally different. They could not be designed as belfries, as they are placed near the steeples of churches, infinitely more commodious for that end; nor places of alarm, as they are often erected in situations unfit for that purpose. The most probable opinion therefore seems to be that of the late Mr Peter Collinson, viz. that they were *Inclusoria*; *et ardi inclusorii ergastula*, the prisons of narrow inclosures: that they were used for the confinement of penitents; some perhaps constrained, others voluntary. *Dunchad o Braoin* being said to have retired to such a prison, where he died A. D. 987. The penitents were placed in the upper story; after undergoing their term of probation, they were suffered to descend to the next; after that, they took a second step, till at length, the time of purification being fulfilled, they were released and received again into the bosom of the church. Mr Collinson says that they were built in the 10th and 11th centuries. The religious were in these days the best architects, and religious architecture the best of any. Ireland being the land of sanctity, *Patria Sanctorum*, the people

of that country might be the original inventors of these towers of mortification. They abound there; and, in all probability, might be brought into Scotland by some of those holy men who dispersed themselves to all parts of Christendom to reform mankind.

The castle of Brechin was built on an eminence, a little south of the town; but no vestige of it is now left. It underwent a long siege in the year 1303; was gallantly defended against the English under Edward III.; and, notwithstanding all the efforts of that potent prince, the brave governor Sir Thomas Maule, ancestor of the present earl of Panmure, held out this small fortress for 20 days, till he was slain by a stone cast from an engine on the 20th of August, when the place was instantly surrendered.—Brechin is also remarkable for a battle fought near it, in consequence of the rebellion raised in 1452, on account of the murder of the earl of Douglas in Stirling castle. The victory fell to the royalists under the earl of Huntly. The malecontents were headed by the earl of Crawford, who, retiring to his castle of Finhaven, in the frenzy of disgrace declared, that he would willingly pass seven years in hell, to obtain the glory which fell to the share of his antagonist.

BRECKNOCK, or BRECON, a town of Brecknockshire in Wales, and capital of the county. It is called by the Welch *Aber-Honday*, and is seated at the confluence of the rivers Honday and Usk, over which there is a handsome stone bridge. It is an ancient place, containing three churches, one of which is collegiate, and is seated at the west end of the town. The houses are well built. Here was formerly a stately castle, and a strong wall, through which there were three gates, that are all demolished. It sends one member to parliament. It is well inhabited, which is in some measure owing to its being the town where the assizes are kept; and there is here a considerable woollen-manufactory. The markets are well supplied with cattle, corn, and provisions. W. Long. 3. 15. N. Lat. 52. o.

BRECKNOCKSHIRE, a county of Wales, bounded by Radnorshire, on the north; Cardiganshire and Caermarthenshire, on the west; Herefordshire and Monmouthshire, on the east; and by Glamorganshire and Monmouthshire, on the south. It is 35 miles in length, 30 in breadth, and about 100 in circumference. It is surrounded with hills, which render the air in the valleys pretty temperate. The soil on the hills is very stony, but the streams descending from thence into the valleys render them fruitful both in corn and grass. The chief commodities here are corn, cattle, fish, and otter's fur, besides manufactures of cloth and stockings. The principal rivers are the Usk, the Wye, and the Yvon. The chief towns are Brecknock, Bealt, and Hay.

Two miles to the east of Brecknock is a large lake, called *Brecknock Meer*, and by the Welch *Llyn Savaddan*; it is two miles in length, and nearly the same in breadth. It contains plenty of otters, tench, perch, and eels. The county sends one member to parliament. It is in the diocese of Landaff, and contains 61 parishes, and is divided into six hundreds.

BREDA, a town in Holland, the capital of Dutch Brabant. It is a large, populous, well-built city, regularly fortified after the modern way, and is one of the strongest places on the Dutch frontiers. It is seated on the river Meck, in a marshy country, which may be overflowed

overflowed and rendered inaccessible to an army. It is 4000 paces in circumference, and contains upwards of 2000 houses. It is not very well built, but has one handsome street. The town is of a triangular figure, and the ramparts are all planted round with elms. At every angle there is a gate built with brick. The curtains are flanked with 15 bastions, planted with cannon, and by 15 ravelins. The great church is a noble structure, remarkable for its fine spire, which is 362 feet high. The mausoleum of Angelbert II. count of Nassau, is a curious piece adorned with several statues and inscriptions suitable to the occasion. In 1577, the garrison delivered this city to the States-general; but it was retaken in 1581, by Cloude de Baylaimont, assisted by the baron de Frefin, who was prisoner therein. In 1590, prince Maurice took it again from the Spaniards; but Spinola became master of it in 1625, after a siege of six months. It was retaken by the prince of Orange, for the United Provinces, in 1637. There was a congress held here, and peace concluded, in 1667, between the Dutch and the English. E. Long. 4. 45. N. Lat. 51. 35.

BRECH of a great gun, or cannon, the end next the touch-hole.

BRECHES, a garment worn by males, reaching from the girdle to the knees, and serving to cover the hips, thighs, &c.

The ancient Romans had nothing in their dress answering to our breeches and stockings; instead of which, under their lower tunics and waistcoats, they sometimes bound their thighs and legs round with silken scarves or fasciæ, called *tibiaia* and *femoralia*. Breeches appear to be a habit peculiar to the barbarous nations, especially those inhabiting the colder countries of the north; whence Tacitus calls them *barbarum tegmen*. We find mention made of them among the ancient Getæ, Sarmatæ, Gauls, Germans, and Britons; they also obtained among the Medes and Persians, as being a people of Scythian origin: they also afterwards got footing in Italy, some pretend as early as the time of Augustus; but without much foundation, that emperor's breeches, mentioned by Suetonius, being apparently only swaths tied over his thighs. However this be, breeches were at last received into Italy, and grew so highly into fashion, that it was thought necessary under Honorius and Arcadius, to restrain them by law, and expel the *bracarii* or breeches-makers out of the city; it being thought unworthy of a nation that commanded the world, to wear the apparel of barbarians.

BREECHINGS, in the sea-language, the ropes with which the great guns are lashed or fastened to the ship's side. They are thus called, because made to pass round the breech of the gun.

BREEDING, in a general sense, the producing, nourishing, and educating all manner of young animals.

BREEDING, in a moral sense, denotes a person's deportment or behaviour in the external offices and decourments of social life. In this sense we say *well-bred*, *ill-bred*, *a man of breeding*, &c. Good-breeding is hard to define; none can understand the speculation but those who have the practice. Good-breeding amounts to much the same with what is otherwise called *politeness*, among the ancient Romans *urbanity*. Good-breeding is near to virtue, and will of itself lead a man a great part of the way towards the same. It teaches him to

rejoice in acts of civility, to seek out objects of compassion, and to be pleased with every occasion of doing them good offices. Lord Shaftesbury compares the well-bred man with the real philosopher: both characters aim at what is excellent, aspire to a just taste, and carry in view the model of what is beautiful and becoming. The conduct and manners of the one is formed according to the most perfect ease, and good entertainment of company; of the other, according to the strictest interest of mankind; the one according to his rank and quality in his private station, the other according to his rank and dignity in nature. Horace seems to have united both characters,

Quid verum atque decens curis et rogo, et omnis in hoc sum.

See the article *Good-MANNERS*.

BREEDING of Horses: See EQUUS.

BREEDING of Fish. The necessary qualities of a pond, to make it serve well for breeding fish, are very different from those which are to make it serve for the feeding of them, inasmuch that some particular ponds serve only for one of these purposes, and others for the other; and scarce ever the same pond is found to answer for them both. In general, it is much more rare to find a good breeding pond than a good feeding one. The best indications for a good breeding pond are these; that there be a good quantity of rushes and grass about its sides, with gravelly shoals, such as horse-ponds usually have: when a pond has this property, and takes to the breeding of fish, it is amazing what a progress will be made in a little time. The spawn of fish is prodigious in quantity; and where it succeeds, one is able to produce many millions: thus, in one of these breeding ponds, two or three meters, and as many spawners, will, in a very little time, stock the whole country. When these ponds are not meant entirely for breeding, but the owner would have the fish to grow to some size in them, the method is to thin the numbers, because they would otherwise starve one another, and to put in other fish that will prey upon the young, and thin them in the quickest manner. Eels and perch are the most useful on this account; because they prey not only upon the spawn itself, but upon the young fry from the first hatching to the time they are of a considerable size. Some fish are observed to breed indifferently in all kinds of waters, and that in considerable plenty; of this nature are the roach, pike, and perch.

BREEZE, a shifting wind that blows from sea or land for some certain hours in the day or night; common in Africa and some parts of the East and West Indies.

Breezes differ from *etisie* or trade-winds, as the former are diurnal, or have their periods each day; and the latter are anniversary, and blow at a distance from land. The sea-breezes blow by day, and the land-breezes by night; so that, dividing their empire, they remain constant as the seasons of the year, or course of the sun, on which they seem to depend: not but that they appear sooner or later, stronger or weaker, in some places than in others; and vary the alternative according to the several latitudes, situations, and soils, &c. of the countries where they are found. See the article *WIND*.

BREEZE-Fly. See TABANUS.

BREGENTZ, or BERGENTZ, a town of Tyrol in Germany, situated at the east end of the lake of Constance, in E. Long. 9. 40. N. Lat. 47. 36.

BREGMA,

Bregma
Bremen.

See Ana-
tomy, n^o 9,
10, 11.

BREGMA, in anatomy, the fame with finciput †. BREHONS, the provincial judges among the ancient Irish, by whom justice was administered, and controversies decided. These judges were a distinct tribe or family, to whom competent lands were allowed in inheritance. In criminal cases the brehon had the eleventh part of all the fines; which could not but be considerable at a time when murders, rapes, robberies, and the like offences, were only subject to pecuniary commutations.

BREHON-LAWS, or *Leges Brehonicae*, denote the general maxims or rules of law observed by the brehons, and having the force of laws throughout all the provinces of Ireland. Several fragments of the *leges brehonicae* are still extant in public and private libraries. The most complete collection is that belonging to the duke of Chandos; containing 22½ sheets close written, full of abbreviated words, and not very legible. By the statute of Kilkenny, made under Edward III. it is enacted that no English subject shall submit to a trial by the brehon law, on the penalty of high treason. Notwithstanding which, many were still under a necessity of being concluded by the Irish laws and customs, till the whole kingdom was settled on an English bottom by king James I.

BREHAR, one of the Scilly islands, lying almost directly west of the land's end in Cornwall, about the distance of 30 miles. It lies between the isles of Micalto, Guel, Trefcaw, and Samfon. It is the roughest and most mountainous of them all, and not many years since there were only two families in it, but now there are 13. There are a few poor houses, called the *town of Brehar*; and there are several BARROWS edged with stone, in which they buried considerable persons in ancient times; besides many monuments of the DRUIDS. Some are of opinion, that this with the rest made but one island, which is the reason why so many antiquities are now found in most of them.

BREMEGARTON, a handsome and pretty considerable town of Switzerland, in the territory of Fyen-Aempter, between the cantons of Zurich and Bern. The inhabitants deal chiefly in paper; and their religion is the Roman-catholic. It is divided into the upper and lower towns, and is very advantageously seated on the river Rufs. E. Long. 8. 25. N. Lat. 47. 20.

BREMEN, a large, populous, and very strong town of Germany, capital of a duchy of the same name, with an archbishop's see, secularized in favour of the Swedes, but now belongs to the elector of Hanover. The river Weser runs through the middle, and divides it into the old and new town. In September 1739, while the inhabitants were asleep, the magazine of powder was set on fire by lightning; and all the houses were shook, as if there had been a violent earthquake, which threw them into a terrible conflagration. This town is divided into four quarters, each of which has a burgomaster; and in the middle there is a large market-place, with the statue of Rolando. E. Long. 8. 45. N. Lat. 53. 40.

BREMEN, a duchy of Germany, in the province of lower Saxony, lying between the rivers Weser and the Elbe; of which the former separates it from the duchy of Oldenburg, and the other from that of Holstein. The air is cold; but the country is fertile, and well peopled. It formerly belonged to the Swedes, but was

afterwards sold to the king of Great Britain, as elector of Hanover, in 1716. In the winter it is subject to inundations. In 1617, on Christmas-day, several thousand cattle were drowned, besides several hundred of men; and the country was so covered with water, that it has cost immense sums to repair the dykes. Bremen is the capital town.

BREMEN-VEERD, a town of Germany, in the circle of lower Saxony, and duchy of Bremen. It is an open town, seated on the river Oost, and was formerly the place of residence of the archbishop. E. Long. 8. 35. N. Lat. 53. 58.

BRENNUS, a celebrated captain among the Gauls, who, about 388 years before the Christian era, entered Italy with a powerful army; made great conquests there; defeated the Romans; and sacked Rome. The capitol alone was defended; and Camillus coming to its relief, drove the Gauls not only out of Rome, but out of all Italy. See (*History of*) ROME.

BRENT, a town of Devonshire, with a market on Saturdays, and two fairs, on May 13th and October 10th, for horned cattle. It is but a small place, and lies on the road from Exeter to Plymouth, being 26 miles south-west from the former, and 198 west-by-south of London. W. Long. 5. 7. N. Lat. 50. 30.

BRENT GOOSE, a species of goose with a black neck, and a white collar round; usually confounded with the barnacle, tho' in reality a distinct species. See ANAS.

BRENTFORD, a town of Middlesex, in the great London road to the west. It is divided into old and new Brentford, in which last are the church and market-house. It is a long place, well stocked with public houses, and is seated on the river Thames, in W. Long. 0. 10. N. Lat. 51. 26.

BRENTWOOD, or BURNTWOOD, a town of Essex in England; it stands on a rising ground in the road from London to Colchester, and has several good inns. E. Long. 0. 25. N. Lat. 51. 38.

BREWERWOOD (Edward), a very learned English mathematician and antiquary, was the son of Robert Brerewood a tradesman, who was thrice mayor of Chester; and born in that city in the year 1565. He was educated in grammar learning at the free school in Chester; and afterwards admitted, in 1581, of Brasen-nose-college in Oxford. In the year 1596, he became the first professor of astronomy in Gresham-college in London; where he led the same private and retired course of life that he had before done in Oxford. He died there of a fever, upon the 4th of November 1613, much lamented. He was a great searcher into antiquity and curious knowledge; but is remarkable for having never published any thing during his lifetime. After his death came out the following works. 1. *De ponderibus et pretiis veterum nummorum*. 2. Inquiries touching the diversities of languages and religion through the chief parts of the world. 3. *Elementa logicae in gratiam studiosae juventutis in Acad. Oxon.* 4. *Tractatus quidam logici*. 5. 6. Two treatises on the Sabbath. 7. *Tractatus duo, quorum primus est de meteoris, secundus de oculo*. 8. *Commenarij in ethica Aristotelis*. Mr. Wood tells us, that the original manuscript of this, written with his own hand, is in the smallest and neatest characters that his eyes ever beheld; and that it was finished by him on the 27th of October 1586. 9. Patriarchal government of the ancient church.

Bremen
Brewwood.

BRESCIA, a strong and handsome town of Italy, with a bishop's see and a good citadel. It is the capital of Bresciano in the territory of Venice, and is seated in an agreeable plain on the river Garza, in E. Long. 10. 5. N. Lat. 45. 31.

BRESCIANO, a province of Italy in the territory of Venice; bounded on the north, by the Grisons and the bishopric of Trent; on the east, by the lake Garda, the Veronese, and the duchy of Mantua; on the south, by the duchy of Mantua and the Cremonese; and on the west, by the Cremasco, the Burgomasco, and the Valtelina. It is watered by several small rivers, which render it very fertile; and is full of towns and villages, of which Brescia is the capital.

BRESELLO, a small town of Italy, in the duchy of Modena, seated on the river Po, in E. Long. 10. 25. N. Lat. 44. 55.

BRESCICATE, in commerce, a kind of bays, of which there is some trade carried on with the negroes, between the river Gambia and Sierra Leona. The best sorts for that purpose are the blue and the red.

BRESLAU, a small duchy of lower Silesia in Germany, lying between those of Wolaw, Olse, Brigg, Schwednitz, and Lignitz. It is every where level and flat; is an excellent corn country, yielding also good pasture; abounding also with herds of cattle and flocks of sheep; but destitute of wood, except in one district or circle; and the roads in general are very bad. It is an immediate principality, that is, one of which both the property and jurisdiction belong to the king, forming a part of one of the three bailiwicks into which all the immediate principalities are divided.

BRESLAU, the chief town of the duchy of that name, and of all Silesia, is situated at the conflux of the Oder and Ohlau, in E. Long. 17. 5. N. Lat. 51. 4. Including the suburbs, it is of great extent; having many large regular squares, broad streets, stately public and private edifices; but the fortifications are of no great importance. Here are in particular a great many churches and convents belonging to the catholics; of the former are several also belonging to the Lutherans, one to the Calvinists, and another to the Greeks. The Jews have likewise two synagogues, the bishop a stately palace, and the Lutherans two gymnasiums. The Polish university is a noble structure, nor is the exchange destitute of magnificence. This city is the seat of all the high colleges; and the third in rank, next to Berlin and Konigsberg, in all the Prussian dominions. The magistracy of it is Lutheran, and its trade and manufactures are very considerable. Several of the monasteries and nunneries are very magnificent; and there are also some good public libraries in it, with two armouries, a college of physicians, and a mint. Breslau is very populous, and much frequented by Hungarian, Bohemian, Polish, and other merchants, having several yearly fairs. The city was taken by the king of Prussia in 1741, and retaken by the Austrians in 1757; but the king of Prussia took it back again the same year, and gained a signal victory over the Austrians at Leuthen, a village not far from the capital.

BRESSE, a province of France, bounded on the north, by Burgundy and the Franche Comte; on the east, by Savoy; on the south, by Viennois; on the west, by the principality of Dombes and the Somme. It is 40 miles from north to south, and 23 from east to west.

It is fertile in corn and hemp, has fine pastures, and several lakes with plenty of fish. It is divided into the higher and lower; the first is on the side of Bourges, and the second towards St Trivier and the river Sonne. The French got possession of it in 1601. The principal places are Bourgen, Bresse, Montluel, Pont de Vaux, and Coligny.

BRESSICI, in geography. See **BRESSE**.

BREST, a maritime town of France, in north Brittany, seated on the declivity of a hill on the side of its port, which is the largest in the kingdom, and will hold 500 ships at a time. There is an arsenal with warehouses, which was placed there on account of its nearness to the woods, mines of iron, and other things proper for the building of ships. It was entirely consumed by fire in 1744, which was an irreparable loss to France. The entrance into the port is guarded by a strong castle seated on a rock, which cannot be attempted on the sea side, because it is craggy, and is defended on the land side by a large ditch and other fortifications. The streets of Brest are very narrow, ill contrived, few in number, and have all a descent. A great quay surrounds this side of the port, which is above a mile in length, and 200 paces broad; and there are magazines on the quay full of all foreign merchandizes. On the other side of the port the fine church of Notre Dame is situated; and in a suburb, which is as big as half the city, there is a strong tower opposite to the castle, at the entrance of the port; there is also a great quay on this side, bordered with large magazines, partly within the rock, which has been cut away to enlarge the place. These are extended almost as far as the bottom of the harbour, where there are two docks very commodious for the building of large ships; the shops and houses of the workmen are all around them: the ropewalks are separated from the city by one of these docks. The entrance into the harbour is called the *gullet*, and is a passage extremely difficult on account of the sunk rocks on both sides of the shore; but there are experienced pilots who carry ships in very safely. The English attempted to take possession of this harbour in 1694, but were disappointed. W Long. 4. 26. N. Lat. 48. 23.

BREST, or *Brest*, in architecture, a term sometimes used for the member of a column, more usually called *torus*. See **Torus**.

BREST-Summers, in timber buildings, are pieces in the outward thereof, into which the girders are framed: this, in the ground-floor, is called a *cell*; and, in the garret-floor, a *beam*.—As to their size, it is the same with that of girders. See **GIRDERS**.

BRESTE, the palatinate of, is one of the provinces of Cujava, in Poland. It lies between the palatinates of Pleskow, Rava, and Lencici Wladislaw. It is divided into four chatelanies, and Breste is the capital of the whole.

BRESTE, or *Brescia*, the capital of the palatinate of Brescia, and of Polesia, in Poland, seated on the river Bog, 80 miles east of Warsaw, and subject to Poland. It is a fortified town, and has a castle built upon a rock. Here is a famous synagogue, resorted to by the Jews from all the countries in Europe. E. Long. 24. 0. N. Lat. 41. 35.

BRET, a name the people on the coasts of Lincolnshire give to the common turbot, a fish extremely plentiful with them, and taken in vast abundance. The way
of

Breteffe,
Breton.

Breton.

of catching them is in a net trailed on the ground by two hories; the one going up to the middle of his body in water, the other on shore.

BRETESSE, in heraldry, denotes a line embattled on both sides.

BRETON, or CAPE-BRETON, an island near the eastern continent of North America, lying between 45 and 47 degrees of north latitude. It is separated from Nova Scotia by a narrow strait called *Canso*, and is about 100 miles in length and 50 in breadth. It is surrounded with little sharp-pointed rocks, separated from each other by the waves, above which some of their tops are visible. All its harbours are open to the east, turning towards the south. On the other parts of the coast there are but a few anchoring places for small vessels, in creeks, or between islets. Except in the hilly parts, the surface of the country has but little solidity, being every where covered with a light moss, and with water. The dampness of the soil is exhaled in fogs, without rendering the air unwholesome. In other respects, the climate is very cold; owing either to the prodigious quantity of lakes, which cover above half the island, and remain frozen a long time; or to the number of forests, that totally intercept the rays of the sun; the effect of which is besides decreased by perpetual clouds.

Tho' some fishermen had long resorted to this island every summer, not more than 20 or 30 had ever fixed there. The French, who took possession of it in August 1713, were properly the first inhabitants. They changed its name into that of *Ile Royale*, and fixed upon Fort Dauphin for their principal settlement. This harbour was two leagues in circumference. The ships came to the very shore, and were sheltered from winds. Forests affording oak sufficient to fortify and build a large city, were near at hand; the ground appeared less barren than in other parts, and the fishery was more plentiful. This harbour might have been rendered impregnable at a trifling expence; but the difficulty of approaching it (a circumstance that had at first made a stronger impression than the advantages resulting from it) occasioned it to be abandoned, after great labour had been bestowed upon the undertaking. They then turned their views to Louisbourg, the access to which was easier; and convenience was thus preferred to security: the fortification of Louisbourg, however, was not begun till 1720.

In the year 1714, some fishermen, who till then had lived in Newfoundland, settled in this island. It was expected that their number would soon have been increased by the Acadians, who were at liberty, from the treaties that had been granted them, to remove with all their effects, and even to dispose of their estates; but these hopes were disappointed. The Acadians chose rather to retain their possessions under the dominion of Britain, than to give them up for any precarious advantage they might derive from their attachment to France. Their place was supplied by some distressed adventurers from Europe, who came over from time to time to Cape Breton, and the number of inhabitants gradually increased to 4000. They were settled at Louisbourg, Fort Dauphin, Port Toulouse, Nerucka, and on all the coasts where they found a proper beach for drying the cod. The inhabitants never applied themselves to agriculture, the soil being unfit for it. They often sowed corn, but it seldom came to matu-

rity; and when it did thrive so much as to be worth reaping, it had degenerated so considerably, that it was not fit for feed for the next harvest. They have only continued to plant a few pot-herbs that are tolerably well tasted, but must be renewed every year from abroad. The poorness and scarcity of pastures has likewise prevented the increase of cattle. In a word, the soil of Cape Breton seemed calculated to invite none but fishermen and soldiers.

Though the island was entirely covered with forests before it was inhabited, its wood has scarce ever been an object of trade. A great quantity, however, of soft wood was found there fit for firing, and some that might be used for timber; but the oak has always been scarce, and the fir never yielded much resin. The peltry trade was a very inconsiderable object. It consisted only in the skins of a few lynxes, elks, mink-rats, wild cats, bears, otters, and foxes both of a red and silver-grey colour. Some of these were procured from a colony of Mickmac Indians who had settled on the island with the French, and never could raise more than 60 men able to bear arms. The rest came from St John's, or the neighbouring continent. Greater advantages might possibly have been derived from the coal-mines which abound in the island. They lie in a horizontal direction; and being no more than six or eight feet below the surface, may be worked without digging deep, or draining off the waters. Notwithstanding the prodigious demand for this coal from New England, from the year 1745 to 1749, these mines would probably have been forsaken, had not the ships which were sent out to the French islands wanted ballast. In one of these mines a fire has been kindled, which could never yet be extinguished.

The people of Cape Breton did not send all their fish to Europe. They sent part of it to the French southern islands, on board 20 or 25 ships from 70 to 140 tons burthen. Besides the cod, which made at least half their cargo, they exported to the other colonies timber, planks, thin oak-boards, salted salmon and mackerel, train-oil, and sea-coal. All these were paid for in sugar and coffee, but chiefly in rum and molasses. The island could not consume all these commodities. Canada took off but a small part of the overplus; it was chiefly bought by the people of New England, who gave in exchange fruits, vegetables, wood, brick, and cattle. This trade of exchange was allowed; but a smuggling trade was added to it, carried on in flour, and salt fish.

This island, the key of Canada, was attacked by the English in 1745; and the event is of so singular a nature, that it deserves a particular detail. The plan of this first invasion was laid at Boston, and New England bore the expence of it. A merchant named *Pepperel*, who had excited, encouraged, and directed the enterprise, was intrusted with the command of an army of 6000 men, which had been levied for this expedition.

Though these forces, conveyed by a squadron from Jamaica, brought the first news to Cape Breton of the danger that threatened it; though the advantage of a surprise would have secured the landing without opposition; though they had but 600 regular troops to encounter, and 800 inhabitants hastily armed; the success of the undertaking was still precarious. What great exploits, indeed, could be expected from a militia

suddenly assembled, who had never seen a siege or faced an enemy, and were to act under the direction of sea-officers only. These unexperienced troops stood in need of the assistance of some fortunate incident, which they were indeed favoured with in a singular manner.

The construction and repairs of the fortifications had always been left to the care of the garrison of Louisbourg. The soldiers were eager of being employed in these works, which they considered as conducive to their safety, and as the means of procuring them a comfortable subsistence. When they found that those who were to have paid them, appropriated to themselves the profit of their labours, they demanded justice. It was denied them, and they determined to assert their right. As these depredations had been shared between the chief persons of the colony and the subaltern officers, the soldiers could obtain no redress. Their indignation against these rapacious extortioners rose to such a height, that they defied all authority. They had lived in open rebellion for six months, when the British appeared before the place.

This was the time to conciliate the minds of both parties, and to unite in the common cause. The soldiers made the first advances; but their commanders mistrusted a generosity of which they themselves were incapable. It was firmly believed that the soldiers were only desirous of falling out, that they might have an opportunity of deserting; and their own officers kept them in a manner prisoners, till a defence so ill-managed had reduced them to the necessity of capitulating. The whole island shared the fate of Louisbourg, its only bulwark.

This valuable possession, restored to France by the treaty of Aix la Chapelle, was again attacked by the British in 1758. On the 2^d of June, a fleet of 23 ships of the line and 18 frigates, carrying 16,000 well disciplined troops, anchored in Gabarus bay, within half a league of Louisbourg. As it was evident it would be to no purpose to land at a great distance, because it would be impossible to bring up the artillery and other necessities for a considerable siege, it had been attempted to render the landing impracticable near the town. In the prudent precautions that had been taken, the besiegers saw the dangers and difficulties they had to expect; but, far from being deterred by them, they had recourse to stratagem, and while by extending their line they threatened and commanded the whole coast, they landed by force of arms at the creek of Cormorant.

This place was naturally weak. The French had fortified it with a good parapet planted with cannon. Behind this rampart they had posted 2000 excellent soldiers and some Indians. In front they had made such a close hedge with branches of trees, that would have been very difficult to penetrate, even if it had not been defended. This kind of palliade, which concealed all the preparations for defence, appeared at a distance to be nothing more than a verdant plain.

This would have preserved the colony, had the assailants been suffered to complete their landing, and to advance with the confidence that they had but few obstacles to surmount. Had this been the case, overpowered at once by the fire of the artillery and the small arms, they would infallibly have perished on the shore, or in the hurry of embarking; especially as the sea was just then very rough. This unexpected loss might have

interrupted the whole project.

But all the prudent precautions that had been taken, were rendered abortive by the impetuosity of the French. The English had scarce begun to move towards the shore, when their enemies hastened to discover the snare they had laid for them. By the brisk and hasty fire that was aimed at their boats, and still more by the premature removal of the boughs that masked the forces, which it was so much the interest of the French to conceal, they guessed at the danger they were going to rush into. They immediately turned back, and saw no other place to effect their landing but a rock, which had been always deemed inaccessible. General Wolf, though much taken up in reembarking his troops, and sending off the boats, gave the signal to major Scot to repair thither. That officer immediately removed to the spot with his men. His own boat coming up first, and sinking at the very instant he was stepping out, he climbed up the rock alone. He was in hopes of meeting with 100 of his men who had been sent thither some hours before. He found only ten. With these few, however, he gained the summit of the rock. Ten Indians and 60 Frenchmen killed two of his men, and mortally wounded three. In spite of his weakness, he stood his ground under cover of a thicket, till his brave countrymen, regardless of the boisterous waves and the fire of the cannon, came up to him, and put him in full possession of that important post, the only one that could secure their landing. The French, as soon as they saw that the enemy had got a firm footing on land, betook themselves to the only remaining refuge, and shut themselves up in Louisbourg. The fortifications were in a bad condition, because the sea fad, which they had been obliged to use, is by no means fit for works of masonry. The revetments of the several curtains were entirely crumbled away. There was only one casemate and a small magazine that were bomb proof. The garrison which was to defend the place consisted only of 2,900 men.

Notwithstanding all these disadvantages, the besieged were determined to make an obstinate resistance. It is scarce credible that the French were confirmed in their resolution by the courage of a woman. Madame de Drucourt was continually upon the ramparts, with her purse in her hand; and firing herself three guns every day, seemed to dispute with the governor her husband the glory of his office. The besieged were not dismayed at the ill success of their several sallies, or the masterly operations concerted by admiral Boscawen and general Amherst. It was but at the eve of an assault, which it was impossible to sustain, that they talked of surrendering. They made an honourable capitulation; and the conqueror shewed more respect for his enemy and for himself, than toully his glory by any act of barbarity or avarice.

BRETTIGAW, a territory or valley of the Grisons, lying between the Rhine and the county of Tyrol, and along the river Lanquet. The fortress of Castels is the principal town.

BREVE, in law, is any writ directed to the chancellor, judges, sheriffs, or other officers, whereby a person is summoned, or attached, to answer in the king's court, &c.

BREVE *Perquirere*, the purchasing of a writ or licence for trial in the king's courts; whence comes the present

Breve
||
Breugel.

present use of paying 6s. 8d. fine to the king in fuit, for money due on bond, where the debt is 40l. and of 10s. where it is 100l. &c.

BREVE *de Recto*, is a writ of right or licence, for a person ejected, to sue for the possession of the estate detained from him.

BREVE, in music, a note or character of time, in the form of a diamond or square, without any tail, and equivalent to two measures or minims.

BREVET, in the French customs, denotes the grant of some favour or donation from the king; in which sense it partly answers to our warrant, and partly to letters-patent.

BREVET, more particularly denotes the commission of a subaltern officer, being only written on parchment, and without seal.

BREUGEL (Peter), an eminent painter, commonly called *Old Breugel*, was born at a village of the same name near Breda, in the year 1565; and was the first pupil of Peter Cock, whose daughter he married. It was customary with him to dress like a country-man, in order to be more easily admitted into the company of country-people, and be allowed to join in their frolics, by which means he became perfectly acquainted with their manners and gestures, of which he made excellent use in his pictures. He travelled to France and Italy, and for a long time studied landscapes on the mountains of Tyrol. His humorous turn of mind displayed itself in all his pictures, which generally consisted of country-dances, marriages, sports, and diversions; tho' he sometimes performed pieces from the historical parts of the holy Scriptures. At his return from Italy, he settled at Antwerp, and in his last illness caused his wife to gather together all his immodest pieces and burn them before his face. He died at Antwerp; but in what year cannot be ascertained.—He had a son named *Peter*, who also distinguished himself by his paintings; and *John*, the subject of the following article.

Of the works of old Breugel, the great duke of Tuscany has, Christ carrying his cross, with a great number of figures; and a country feast. The emperor has the tower of Babel, the massacre of the Innocents, and the conversion of St Paul, of his painting: the elector Palatine, a landscape, with St Philip baptizing queen Candace's eunuch; and St John preaching in the wilderness, with a great many figures.

BREUGEL (John), commonly called *Velvet Breugel*, from his generally wearing velvet clothes, was the son of Peter Breugel, and born about the year 1575. He first applied himself to painting flowers and fruit, in which he excelled; and afterwards had great success in drawing landscapes, and views of the sea, set off with small figures. He lived long at Cologne, where he acquired great reputation. He travelled to Italy, where his fame had got before him; and where his fine landscapes, adorned with small figures superior to those of his father, gave very great satisfaction. If a good judgment may be formed from the great number of pictures he left behind him, all highly finished, he must have been exceedingly industrious. Nor did he satisfy himself with embellishing his own works only, but was very useful in this respect to his friends. Even Rubens made use of Breugel's hand in the landscape part of several of his small pictures, such as his Vertumnus and Pomona; the satyr viewing the sleeping nymph; and the

terrestrial paradise, which is looked upon as his masterpiece; and, together with the two former, was done for king William III. of Great Britain. He died in 1642, in the 67th year of his age.

Several of his works are to be seen in the archbishop's gallery at Milan; particularly a hunting-piece with a vast many figures; a landscape representing a desert, with the picture of St Hierom painted by Cerrano, alias Gro Baptista Crespi. In the Ambrosian library are 20 pieces of this masterly hand; particularly, Daniel in the lion's den, the inside of the great church at Antwerp, the four seasons on copper, and the burning of Gomorrah. In the possession of the elector Palatine at Dusseldorp, Christ preaching on the sea-shore; a country-dance; a sea-port, with a great many figures; a coach and two chariots, with a multitude of figures and animals; a landscape, wherein Flora is crowned by a nymph; St John preaching in the wilderness; a small sea-landscape, and several other pieces. In the possession of the king of France, a woman playing with a dog, the battle between Alexander and Darius, both in wood; Orpheus in hell, &c.

BREVIARY, a daily office, or book of divine service, in the Romish church. It is composed of matins, lauds, first, third, sixth, and ninth vespers, and the compline, or post communion.

The breviary of Rome is general, and may be used in all places; but on the model of this various others have been built, appropriated to each diocese, and each order of religious.

The breviary of the Greeks is the same in almost all churches and monasteries that follow the Greek rites: the Greeks divide the psalter into 20 parts. In general, the Greek breviary consists of two parts; the one containing the office for the evening, the other that of the morning, divided into matins, lauds, first, third, sixth, and ninth vespers, and the compline; that is, of seven different hours, on account of that saying of David, *Septies in die laudem dixi tibi*.

The institution of the breviary is not very ancient: there have been inserted in it the lives of the saints, full of ridiculous and ill-attested stories, which gave occasion to several reformations of it, by several councils, particularly those of Trent and Cologne; by several popes, particularly Pius V. Clement VIII. and Urban VIII.; and also by several cardinals and bishops, each lopping off some extravagances, and bringing it nearer to the simplicity of the primitive offices. Originally, every body was obliged to recite the breviary every day; but by degrees the obligation was reduced to the clergy only, who are enjoined, under penalty of mortal sin and ecclesiastical censures, to recite it at home, when they cannot attend in public. In the 14th century, there was particular reserve granted in favour of bishops, who were allowed, on extraordinary occasions, to pass three days without rehearsing the breviary.

This office was originally called *curfus*; and afterwards, the *breviarium*: which latter name imports that the old office was abridged; or rather, that this collection is a kind of abridgment of all the prayers.

The breviaries now in use are innumerable; the difference between them consists principally in the number and order of the psalms, hymns, pater-nosters, ave-Maries, creeds, magnificates, cantemus's, benedictus's, canticamus's, nunc dimittis's, miserere's, hallelujah's, gloria

Breugel,
Breviary.

gloria patriæ, &c.

BREVIARY, in Roman antiquity, a book first introduced by Augustus, containing an account of the application of the public money.

BREVIATOR, an officer under the eastern empire, whose business it was to write and translate briefs.—At Rome those are styled *breuiatores*, or *abbreviators*, who dictate and draw up the pope's briefs.

BREVIBUS A ROTULIS LIBERANDIS, a writ or command to a sheriff to deliver to his successor the county, with the appurtenances, and the rolls, writs, and other things to his office belonging.

BREVIÉ, among printers, a small kind of type or letter between bourgeois and minion.

BREVIUM custos. See Custos.

BREVORDT, a town of Guelderland, in the United Netherlands, situated in E. Long. 6. 35. N. Lat. 52°.

BREWER (Anthony), a dramatic poet who flourished in the reign of king Charles I. and appears to have been held in high estimation by the wits of that time, as may be more particularly gathered from an elegant compliment paid to him in a poem called *Steps to Parnassus*, wherein he is supposed to have a magic power to call the muses to his assistance, and is even set on an equality with the immortal Shakespeare himself. There are, however, great disputes among the several writers as to the number of his works. Those which have been ascribed to him with any certainty are, 1. The country girl, a comedy. 2. The love-sick king, a comedy. And, 3. *Lingua*: a piece in regard to which Winstanley records a remarkable anecdote, which points it out to have been in some measure the innocent cause of those troubles that disturbed the peace of these realms in the middle of the 17th century. He tells us, that, when this play was acted at Cambridge, Oliver Cromwell (then a youth) acted a part in it. The

substance of the piece is a contention among the Senates for a crown which Lingua had laid for them to find. The part allotted to young Cromwell was that of *Tactus*, or *Touch*; who, having obtained the contested coronet, makes this spirited declamation:

Roses and bays, pack hence! this crown and robe
My brows and body circles and invests:
How gallantly it fits me! sure the slave
Mistr'd my head who wrought this coronet.—
They lie that say complexions cannot change!
My blood's ennobled, and I am transform'd
Unto the sacred temper of a king.
Methinks I hear my noble parasites
Styling me *Cæsar*, or *Great Alexander*,
Licking my toes, &c.

It is said that he felt the whole part so warmly, and more especially the above-quoted speech, that it was what first fired his soul with ambition, and excited him, from the possession of an imaginary crown, to stretch his views to that of a real one; for the accomplishment of which he was content to wade through seas of blood.

BREWER, a person who professes the art of brewing. There are companies of brewers in most capital cities; that of London was incorporated in 1427 by Henry VI. and that of Paris is still older.

The apparatus and utensils of a brewer, or a brew-house, are, A furnace made close and hollow for saving fuel, and with a vent for the smoke lest it taint the liquor; a copper, which is preferable to lead; a mask-vat near the head; a cooler near the mask-vat; and a guile-vat under the cooler: adjoining to all are several clean tubs, to receive the worts and liquors.

BREWERS-HAVEN, a good harbour at the north end of the island of Chiloe on the coast of Chili, in South America, and in the South Sea. The Dutch landed forces here in 1643, desirous to get possession of some part of Chili; but they were driven from thence by the Spaniards and the natives. W. Long. 82°. S. Lat. 42°.

B R E W I N G,

THE operation of preparing ale or beer from MALT.

¹
No settled
theory of
brewing.

Though the art of brewing is undoubtedly a part of chemistry, and certainly depends upon fixed and inviolable principles as well as every other branch of that science, these principles have never yet been thoroughly investigated. For want of a settled theory, therefore, the practice of this art is found to be precarious; and to succeed unaccountably with some, and misgive as unaccountably with others. Some few hints, however, have been thrown out, in order to establish a regular theory of brewing; the principal of which we shall lay before our readers.

²
Common
processes de-
scribed.

The usual process of brewing is as follows. A quantity of water, being boiled, is left to cool till the height of the steam be over; when so much is poured to a quantity of malt in the mashing tub, as makes it of a consistence stiff enough to be just well rowed up: after standing thus a quarter of an hour, a second quantity of the water is added, and rowed up as before: lastly, the full quantity of water is added; and that in proportion as the liquor is intended to be strong or weak.—This part of the operation is called *mashing*.—The whole now stands two or three hours, more or less, ac-

cording to the strength of the wort or the difference of weather, and is then drawn off into a receiver; and the mashing repeated for a second wort, in the same manner as for the first, only the water must be cooler than before, and must not stand above half the time. The two worts are then to be mixed, the intended quantity of hops added, and the liquor close covered up, gently boiled in a copper for the space of an hour or two; then let into the receiver, and the hops strained from it into the coolers. When cool, the barm or yeast is applied; and it is left to work or ferment till it be fit to tun up. For small beer there is a third mashing with the water near cold, and not left to stand above three quarters of an hour; to be hopped and boiled at discretion. For double beer or ale, the liquors resulting from the two first mashings must be used as liquor for a third mashing of fresh malt.

From considering this process, and the multiplicity of circumstances to be attended to in it, we may easily see that it must be a very precarious one. The success of the operation, *i. e.* the goodness of the beer, must depend upon the quality of the malt from which it is made; on that of the water with which it is infused; on the degree of heat applied in the infusion; on the length

³
Difficulties
attending

length of time the infusion is continued; on the proper degree of boiling, the quantity and quality of the hops employed; on the proper degree of fermentation, &c.: all which, as already observed, have never yet been thoroughly investigated and ascertained.

4
Sir Robert
Murray's
method of
malt-ma-
king.

The manner of making malt Sir Robert Murray describes as follows.—Take good barley newly threshed, &c.; put about six English quarters in a stone trough full of water, where let it keep till the water be of a bright reddish colour; which will be in about three days, more or less, according to the moisture or dryness, smallness or bigness, of the grain, the season of the year, or the temperature of the weather. In summer, malt never makes well; in winter it requires longer steeping than in spring or autumn. It may be known when it is steeped enough by other marks besides the colour of the water; as by the excessive swelling of the grain if it be over-steeped, and by too much softness; being, when it is in a right temper, like the barley prepared to make broth of. When it is sufficiently steeped, take it out of the trough, and lay it in heaps to let the water drain from it; then, after two or three hours, turn it over with a scoop, and lay it in a new heap, 20 or 24 inches deep. This is called the *coming heap*, in the right management whereof lies the principal skill. In this heap it may lie 40 hours, more or less, according to the forementioned qualities of the grain, &c. before it come to the right temper of malt; which that it may do equally, is mainly desired. While it lies in this heap, it must be carefully looked to after the first 15 or 16 hours: for about that time the grains begin to put forth roots; which when they have equally and fully done, the malt must, within an hour after, be turned over with a scoop; otherwise the grains will begin to put forth the blade and spire also, which must by all means be prevented. If all the malt do not come equally, but that which lies in the middle, being warmest, come the soonest; the whole must be turned, so that what was outmost may be inmost; and thus it is managed till it be all alike. As soon as the malt is sufficiently come, turn it over, and spread it to a depth not exceeding five or six inches; and by that time it is all spread out, begin and turn it over again three or four times. Afterwards turn it over in like manner once in four or five hours, making the heap deeper by degrees; and continue to do so for the space of 48 hours at least. This frequent turning it over, cools, dries, and deadens the grain; whereby it becomes mellow, melts easily in brewing, and separates entirely from the husk. Then throw up the malt into a heap as high as you can; where let it lie till it grow as hot as your hand can endure it, which usually happens in about the space of 30 hours. This perfects the sweetness and mellowness of the malt. After it is sufficiently heated, throw it abroad to cool, and turn it over again about six or eight hours after; and then lay it on a kiln with a hair-cloth or wire spread under it; where, after one fire which must last 24 hours, give it another more slow, and afterwards, if need be, a third: for if the malt be not thoroughly dried, it cannot be well ground, neither will it dissolve well in the brewing; but the ale it makes will be red, bitter, and unfit for keeping.

From this account of the process of malting, it appears, that, besides the proper management in wetting, turning, &c. the drying is an article of the utmost con-

sequence; and concerning the proper degrees of heat to be employed for this purpose, M. Combrune has related the following experiments. "In an earthen pan, of about two feet diameter, and three inches deep, I put as much of the palest malts, very unequally grown, as filled it on a level to the brim. This I placed over a little charcoal lighted in a small stove, and kept continually stirring it from bottom to top; at first it did not feel so damp as it did about half an hour after.

"In about an hour more, it began to look of a bright orange colour on the outside, and appeared more swelled than before. Every one is sensible how long continued custom alone makes us sufficient judges of colours. Then I macerated some of the grains, and found they were nearly such as are termed *brown malts*. On stirring and making a heap of them towards the middle, I placed therein at about half depth the bulb of my thermometer, and found it rose to 140 degrees: here the malt felt very damp, and had but little smell.

"At 165 degrees I examined it in the same manner as before, and could perceive no damp: the malt was very brown; and, on being macerated, some few black specks appeared.

"Now many corns, nearest the bottom, were become black and burnt: with all the diligence I could use, I placed my thermometer nearly there, and it rose to 175 degrees. But the particles of fire, arising from the stove, act on the thermometer in proportion to the distance of the situation it is placed in; for which, through the whole experiment, an abatement of 5 degrees should be allowed, as near as I could estimate; so, a little after, putting my thermometer in the same position, where nearly half the corns were black, it shewed 180 degrees. I now judged that the water was nearly all evaporated, and the heap grew black again.

"Again, in the centre of the heap raised in the middle of the pan, I found the thermometer at 180 degrees; the corn tasted burnt; and the whole, at top, appeared about one half part a full brown, the rest black: on being macerated, still some white specks appeared; which I observed to proceed from these barley-corns which had not been thoroughly germinated, and whose parts coloring more together, the fire, at this degree of heat, had not penetrated them: their taste was insipid, the malts brittle, and readily parting from the skin: but the thermometer was now more various, as it was nearer to or farther from the bottom; and here I judged all the true malt to be charred.

"However, I continued the experiment; and, at 190 degrees, still found some white specks on macerating the grain; the acrospire always appearing of a deeper black or brown than the outward skin: the corn now fried at the bottom of the pan.

"I next increased the fire; the thermometer, placed in the mean between the bottom of the pan and the upper edge of the corn, shewed 210 degrees. The malt hissed, fried, and smoked abundantly; though, during the whole process, the grain had been kept stirring, yet, on examination, the whole had not been equally affected with the fire. I found a great part thereof reduced to perfect cinders, easily crumbling to dust between the fingers, some of a very black hue without gloss, some very black with oil shining on the outside. Upon the whole, two third parts of the corn

corn

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Mr Com-
brune's ex-
periments
on the dry-
ing of malt;
Essay on
Brewing.

corn were perfectly black; the rest were of a deep brown, more or less so, as they were hard, steeley, or imperfectly germinated; which was easily discovered by the length of the shoot. Most of them seemed to have lost their cohesion, and had a taste resembling that of high roasted coffee.

"In the last stage of charring the malt, I set thereon a wine-glass inverted, into which arose a pinguious oily matter, which tasted very salt. Perhaps it may not be unnecessary to say, that the length of time this experiment took up was four hours, and that the effect it had both on myself and the person who attended me was such as greatly resembled the case of inebriation.

"Though, from hence, it is not possible to fix the exact degree of heat in which malts charred, yet we see some black appeared when the thermometer was at 165 degrees, that some were entirely black at 175 and at 180 degrees, that the grains thus affected were such as had been perfectly germinated, and that those which bore a greater heat were defective in that point; whence we may conclude with an exactness that will be sufficient for the purposes of brewing, that true germinated malts are charred in heats between 175 and 180 degrees; and that as these correspond to the degrees in which pure alcohol, or the finest spirit of the grain itself boils, or disengages itself therefrom, they may point out to us the reason of barley being the fittest grain for the purposes of brewing."

From these experiments, our author has constructed the following table of the different degrees of the dryness of malt, with the colour occasioned by each degree.

Deg.	
119	White.
124	Cream colour.
129	Light yellow.
134	Amber colour.
138	High amber.
143	Pale brown.
148	Brown.
152	High brown.
157	Brown inclining to black.
162	High brown speckled with black.
167	Blackish brown with black specks.
171	Colour of burnt coffee.
176	Black.

"The above table (says he) not only shews us how to judge of the dryness of malt from its colour, but also, when a grist is composed of several sorts of malt, what effect the whole will have when blended together by extraction; and though possibly some small errors may arise in judgments thus formed by our senses, yet as malts occupy different volumes in proportion to their dryness in the practice of brewing, if the result of the water coming in contact with the malt shew the degree expected, such parcel of malt may be said to have been judged of rightly in the degree of dryness it was estimated to; so that the first trial either confirms, or sets us numerically right as to our opinion thereof."

It is found by experience, that the less heat employed in drying the malt, the shorter time will be required before the beer is fit to be used; and of this our author has given the following table.

Deg.		Deg.	
119	2 weeks.	143	6 months.
124	a month.	148	10 months.
129	3 months.	152	15 months.
134	4 months.	157	20 months.
138	6 months.	162	two years.

Lastly, Mr Combrune hath given the following table shewing the tendency beers have to become fine, when properly brewed from malts of different degrees of dryness.

Deg.	Colour of malt.	
119	White.	These, when properly brewed, become spontaneously fine, even as far as 138°; when brewed for amber by repeated fermentations, they become pellucid.
124	Cream colour.	
129	Light yellow.	
134	Amber colour.	
138	High amber.	By precipitation these grow bright in a short time.
143	Pale brown.	
148	Brown.	With precipitation these require 8 or 10 months to be bright.
152	High brown.	
157	Brown inclining to black.	With precipitation these may be fined, but will never become bright.
162	Brown speckled with black.	
167	Blackish brown speckled with black.	These with difficulty can be brewed without setting the galls, and will by no means become bright, not even with the strongest acid menstruum
171	Colour of burnt coffee.	
176	Black.	

In a pamphlet intitled "Theoretic hints on an improved practice of brewing malt-liquors, &c. by John Richardson," we have the following observations on the nature and properties of malt.

"The process of making malt is an artificial or forced vegetation, in which the nearer we approach the footsteps of nature in her ordinary progress, the more certainly shall we arrive at that perfection of which the subject is capable. The farmer prefers a dry season to sow his corn in, that the common moisture of the earth may but gently insinuate itself into the pores of the grain, and thence gradually dispose it for the reception of the future shower, and the action of vegetation. The maltster cannot proceed by such slow degrees, but makes an immersion in water a substitute for the moisture of the earth, where a few hours infusion is equal to many days employed in the ordinary course of vegetation; and the corn is accordingly removed as soon as it appears fully saturated, lest a solution, and consequently a destruction, of some of its parts, should be the effect of a longer continuance in water, instead of that separation which is begun by this introduction of aqueous particles into the body of the grain.

"Were it to be spread thin after this removal, it would become dry, and no vegetation would ensue; but being thrown into the couch, a kind of vegetative fermentation commences, which generates heat, and produces the first appearance of germination. This state of the barley is nearly the same with that of many days continuance in the earth after sowing; but being in so large a body, it requires occasionally to be turned over, and spread thinner; the former to give the outward parts of the heap their share of the required warmth and moisture, both of which are lessened by exposure

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Mr Richardson's observations.

to the air, the latter to prevent the progress of the vegetative to the putrefactive fermentation, which would be the consequence of suffering it to proceed beyond a certain degree.

"To supply the moisture thus continually decreasing by evaporation and consumption, an occasional but sparing sprinkling of water should be given to the floor, to recruit the languishing powers of vegetation, and imitate the shower upon the corn field. But this should not be too often repeated; for, as in the field, too much rain, and too little sun, produce rank stems and thin ears, so here would too much water, and of course too little dry warmth, accelerate the growth of the malt, so as to occasion the extraction and loss of such of its valuable parts, as by a slower process would have been duly separated and left behind.

"By the slow mode of conducting vegetation here recommended, an actual and minute separation of the parts takes place. The germination of the radicles and acrospire carries off the cohesive properties of the barley, thereby contributing to the preparation of the saccharine matter, which it has no tendency to extract or otherwise injure, but to increase and meliorate, so long as the acrospire is confined within the husk; and by how much it is wanting of the end of the grain, by so much does the malt fall short of perfection, and in proportion as it has advanced beyond, is that purpose deferred.

"This is very evident to the most common observation, on examining a kernel of malt in the different stages of its progress. When the acrospire has shot but half the length of the grain, the lower part only is converted into that yellow saccharine flour we are solicitous about, whilst the other half affords no other signs of it than the whole kernel did at its first germination. Let it advance to two thirds of the length, and the lower end will not only have increased its saccharine flavour, but will have proportionally extended its bulk, so as to have left only a third part unmalted. This, or even less than this, is contended for by many maltsters, as a sufficient advance of the acrospire, which they say has done its business as soon as it has passed the middle of the kernel. But we need seek no further for their conviction of error, than the examination here alluded to.

"Let the kernel be slit down the middle, and tasted at either end, whilst green; or let the effects of maceration be tried when it is dried off; when the former will be found to exhibit the appearances just mentioned, the latter to discover the unwrought parts of the grain, in a body of stony hardness, which has no other effect in the mash-tun than that of imbibing a large portion of the liquor, and contributing to the retention of those saccharine parts of the malt which are in contact with it; whence it is a rational inference, that three bushels of malt, imperfect in this proportion, are but equal to two of that which is carried to its utmost perfection. By this is meant the farthest advance of the acrospire, when it is just bursting from its confinement, before it has effected its enlargement. The kernel is then uniform in its internal appearance, and of a rich sweetness in flavour, equal to any thing we can conceive obtainable from imperfect vegetation. If the acrospire be suffered to proceed, the mealy substance melts into a liquid sweet, which soon passes into the blade,

and leaves the husk entirely exhausted.

"The sweet thus produced by the infant efforts of vegetation, and lost by its more powerful action, revives and makes a second appearance in the stem, but is then too much dispersed and altered in its form to answer any of the known purposes of art.

"Were we to inquire, by what means the same barley, with the same treatment produces unequal portions of the saccharine matter in different situations, we should perhaps find it principally owing to the different qualities of the water used in malting. Hard water is very unfit for every purpose of vegetation, and soft will vary its effects according to the predominating quality of its impregnations. Pure elementary water is in itself supposed to be only the vehicle of the nutriment of plants, entering at the capillary tubes of the roots, rising into the body, and there dispersing its acquired virtues, perspiring by innumerable fine pores at the surface, and thence evaporating by the purest distillation into the open atmosphere, where it begins anew its round of collecting fresh properties, in order to its preparation for fresh service.

"This theory leads us to the consideration of an attempt to increase the natural quantity of the saccharum of malt by adventitious means; but it must be observed on this occasion, that no addition to water will rise into the vessels of plants, but such as will pass the filter; the pores of which appearing somewhat similar to the fine strainers or absorbing vessels employed by nature in her nicer operations, we by analogy conclude, that properties so intimately blended with water as to pass the one, will enter and unite with the economy of the other, and *vice versa*.

"Supposing the malt to have obtained its utmost perfection, according to the criterion here inculcated, to prevent its farther progress and secure it in that state, we are to call in the assistance of a heat sufficient to destroy the action of vegetation by evaporating every particle of water, and thence leaving it in a state of preservation, fit for the present or future purpose of the brewer.

"Thus having all its moisture extracted, and being by the previous process deprived of its cohesive property, the body of the grain is left a mere lump of flour, so easily divisible, that, the husk being taken off, a mark may be made with the kernel, as with a piece of soft chalk. The extractable qualities of this flour are, a saccharum closely united with a large quantity of the farinaceous mucilage peculiar to breed corn, and a small portion of oil enveloped by a fine earthy substance, the whole readily yielding to the impression of water applied at different times and different degrees of heat, and each part predominating in proportion to the time and manner of its application.

"In the curing of malt, as nothing more is requisite than a total extrication of every aqueous particle, if we had in the season proper for malting, a solar heat sufficient to produce perfect dryness, it were practicable to reduce beers nearly colourless; but that being wanting, and the force of custom having made it necessary to give our beers various tinctures and qualities resulting from fire, for the accommodation of various tastes, we are necessitated to apply such heats in the drying as shall not only answer the purpose of preservation, but give the complexion and property required.

"To effect this with certainty and precision, the introduction of the thermometer is necessary; but the real advantages of its application are only to be known by experiment, on account of the different construction of different kilns, the irregularity of the heat in different parts of the same kiln, the depth of the malt, the distance of the bulb of the thermometer from the floor, &c. &c. for though similar heats will produce similar effects in the same situation, yet is the dispersion of heat in every kiln so irregular, that the medium spot must be found for the local situation of the thermometer ere a standard can be fixed for ascertaining effects upon the whole. That done, the several degrees necessary for the purposes of porter, amber, pale beers, &c. are easily discovered to the utmost exactness, and become the certain rule of future practice.

"Though custom has laid this arbitrary injunction of variety in our malt-liquors, it may not be amiss to imitate the losses we often sustain, and the inconveniences we combat, in obedience to her mandate.

"The further we pursue the deeper tints of colour by an increase of heat beyond that which simple preservation requires, the more we injure the valuable qualities of the malt. It is well known that scorched oils turn black, and that calcined sugar assumes the same complexion. Similar effects are producible in malts, in proportion to the increase of heat, or the time of their continuing exposed to it. The parts of the whole being so united by nature, an injury cannot be done to the one, without affecting the other; accordingly we find, that such parts of the subject, as might have been severally extracted for the purposes of a more intimate union by fermentation, are, by great heat in curing, burnt and blended so effectually together, that all discrimination is lost, the unfermentable are extracted with the fermentable, the integrant with the constituent, to the very great loss both of spirituousity and transparency. In paler malts, the extracting liquor produces a separation which cannot be effected in brown, where the parts are so incorporated, that unless the brewer is very well acquainted with their several qualities and attachments, he will bring over, with the burnt mixture of saccharine and mucilaginous principles, such an abundance of the scorched oils, as no fermentation can attenuate, no precipitants remove; for, being in themselves impediments to the action of fermentation, they lessen its efficacy, and being of the same specific gravity with the beer, they remain suspended in, and incorporated with the body of it, an offence to the eye, and a nausea to the palate to the latest period."

Quality of the water to be employed in brewing.

The next consideration is the quality of the water to be employed in brewing; and here soft water is universally allowed to be preferable to hard, both for the purposes of mashing and fermentation. Transparency is, however, more easily obtained by the use of hard than soft water; first, from its inaptitude to extract such an abundance of that light mucilaginous matter, which, floating in the beer for a long time, occasions its turbidity; secondly, from its greater tendency to a state of quietude after the vinous fermentation is finished by which those floating particles are more at liberty to subside; and, lastly, from the mutual aggregation of the earthy particles of the water with those of the materials, which by their greater spe-

cific gravity thus aggregated, not only precipitate themselves, but carry down also that lighter mucilage just mentioned. For these reasons, hard water is not well adapted to the brewing of porter, and such beers as require a fulness of palate, when drawn to the great lengths of the London brewery, and of some country situations.

The purity of water is determined by its lightness; and in this, distilled water only can claim any material degree of perfection. Rain water is the purest of all naturally produced: but by the perpetual exhalations of vegetables, and other fine substances floating in the atmosphere, it does not come down to us entirely free from those qualities which pond and river waters possess in a greater degree. These, especially of rivers running through fens and morasses, from the quantity of grass and weeds growing therein, imbibe an abundance of vegetable solutions which occasions them to contain more fermentable matter, and consequently to yield a greater portion of spirit; but at the same time induces such a tendency to acidity as will not easily be conquered. This is more to be apprehended towards the latter end of the summer than at any other time; because these vegetable substances are then in a state of decay, and thence more readily impart their pernicious qualities to the water which passes over them.

At such an unfavourable time, should the brewer be necessitated to pursue his practice, it will behave him to pay the utmost attention to the cause of this disposition in his liquor, and thence endeavour to prevent the ill consequences, by conducting his process to the extraction and combination of such parts of the materials as his judgment informs him will best counteract its effects.

Where there is the liberty of choice, we would commend the use of that water which, from natural purity, equally free of the austerity of imbibed earths, and the rankness of vegetable saturation, has a soft fulness upon the palate, is totally flavourless, inodorous, and colourless; whence it is the better prepared for the reception and retention of such qualities as the process of brewing is to communicate and preserve.

The next thing to be considered is the proper degree of heat to be employed in making the infusion; and here it is evident, that though this must be an object of the utmost importance to the success of the operation, it is extremely difficult, perhaps impossible, to fix upon a precise standard that shall at all times fully answer the purpose. On this subject Mr Richardson presents us with the following observations.

"The quality of the saccharine part of malt resembles that of common sugar, to which it is practicable to reduce it; and its characteristic properties are entirely owing to its intimate connection with the other parts of the malt, from which such distinguishing flavours of beers are derived as are not the immediate result of the hop. Were it not for these properties, the brewer might adopt the use of sugar, molasses, honey, or the sweet of any vegetable, to equal advantage; which cannot now be done, unless an eligible succedaneum be found to answer that purpose. As we are at present circumstanced, a search on the other side would turn more to the brewer's account. We have in malt a superabundance of the grosser principles; and would government permit the introduction of a foreign addition to the saccharine,

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Mr Richardson's observations on the degree of heat.

saccharine, which is too deficient, many valuable improvements might be made from it; as we could, by a judicious application of such adventitious principle, produce a second and third wort, of quality very little inferior to the first.

"But in these experiments a very particular attention would be necessary to the solvent powers of the water at different degrees of heat, and to the inquiry how far a menstrum saturated with one principle may be capable of dissolving another. Such a consideration is the more necessary on this occasion to direct us clear of two extremes equally disagreeable: the first is, that of applying the menstrum pure, and at such a heat as to bring off an over proportion of the oleaginous and earthy principles, which would occasion in the beer, thus wanting its natural share of saccharum, a harshness and austerility which scarce any time the brewer could allow would be able to dissipate; the other is, that of previously loading the menstrum with the adopted sweet in such an abundance as to destroy its solvent force upon the characteristical qualities we wish to unite with it, and thereby leave it a mere solution of sugar. The requisite mean is that of considering what portion of the saccharine quality has been extracted in the first wort, according to the quantity of water and degree of heat applied; and then to make such a previous addition of artificial sweet as will just serve to counterbalance the deficiency, and assimilate with that portion of the remaining principles we are taught to expect will be extracted with the succeeding wort.

"From the nature of the constituent principles of malt, it is easy to conceive, that the former, or saccharine or mucilaginous parts, yield most readily to the impression of water, and that at so low a degree of heat as would have no visible effect upon the latter. If, therefore, we are to have a certain proportion of every part, it is a rational inference, that the means of obtaining it rests in a judicious variation of the extracting heat according to the several proportions required.

"A low degree of heat, acting principally upon the saccharum, produces a wort replete with a rich soft sweet, fully impregnated with its attendant mucilage, and in quantity much exceeding that obtainable from increased heat; which, by its more powerful insinuation into the body of the malt acting upon all the parts together, extracts a considerable portion of the oleaginous and earthy principles, but falls short in softness, fulness, sweetness, and quantity. This is occasioned by the coagulating property of the mucilage, which, partaking of the nature of flour, has a tendency to run into paste in proportion to the increase of heat applied; by which means it not only locks up a considerable part of the saccharum contained therein, but retains with it a proportionate quantity of the extracting liquor, which would otherwise have drawn out the imprisoned sweet, thence lessening both the quantity and quality of the worts. And this has sometimes been known to have had so powerful an effect, as to have occasioned the *setting of the goods*, or the uniting the whole into a pasty mass; for though heat increases the solvent powers of water in most instances, there are some in which it totally destroys them. Such is the presence of flour, which it converts into paste; besides those of blood, eggs, and some other animal substances, which it invariably tends to harden.

"From a knowledge of these effects, we form our ideas of the variations necessary in the heat of the extracting liquor; which are of more extensive utility than has been yet intimated, though exceedingly limited in their extent from one extreme to the other.

"The most common effects of too low a heat, besides sometimes producing immediate acidity, are an insipidity of the flavour of the beer, and a want of early transparency, from the superabundance of mucilaginous matter extracted by such heats, which, after the utmost efforts of fermentation, will leave the beer turbid with such a cloud of its lighter feculencies as will require the separation and precipitation of many months to disperse.

"The contrary application, of too much heat, at the same time that it lessens the mucilage, has, as we have seen before, the effect of diminishing the saccharum also; whence that lean thin quality observable in some beers; and, by extracting an over proportion of oleaginous and earthy particles, renders the business of fermentation difficult and precarious, and impresses an austerility on the flavour of the liquor which will not easily be effaced.

"Yet the true medium heat for each extract cannot be universally ascertained. An attention not only to the quality of the malt, but to the quantity wetted, is absolutely necessary to the obtaining every due advantage; nor must the period at which the beer is intended for use be omitted in the account. The quality of the water also claims a share in the consideration, in order to supply that deficient thinness and want of solvent force in hard, and to allow for the natural fulness and fermentative quality of soft; a particular to which London in a great measure owes the peculiar mucilaginous and nutritious quality of its malt liquors.

"Although the variations above alluded to are indispensable, it is easy to conceive, from the small extent of the utmost variety, that they cannot be far distant. If, therefore, we know that a certain degree extracts the first principles in a certain proportion, we need not much consideration to fix upon another degree that shall produce the required proportion of the remaining qualities, and effect that equal distribution of parts in the extract which it is the business of fermentation to form into a consistent whole."

The principal use of boiling, as it respects the worts Of ⁹boiling particularly, is to separate the groffer or more palpable worts. parts of the extract, preparatory to that more minute separation which is to be effected in the gyle tun. The eye is a very competent judge of this effect; for the concretions into which the continued action of boiling forms those parts are obvious to the slightest inspection, whilst the perfect transparency of the interstices of the worts points out its utility in promoting that desirable quality in the beer. These coagulable parts are formed from the superabundant mucilage already mentioned; and hence they are found in greater proportion in the first worts than in those that come after; at the same time, they are in these last so mingled with a quantity of oleaginous matter, that they become much more difficultly coagulable in the weak worts than in such as are stronger, and hence these require to be much longer boiled than the others.

During this operation the hops are generally added, which are found to be absolutely necessary for prevent-

ing the too great tendency of beer to acidity. The fine essential oil of hops being most volatile and soonest extracted, we are thence taught the advantage of boiling the first wort no longer than is sufficient to form the extract, without exposing it to the action of the fire so long as to dissipate the finer parts of this most valuable principle, and defeat the purpose of obtaining it. To the subsequent worts we can afford a larger allowance, and pursue the means of preservation so long as we can keep in view those of flavour; to which no rules can positively direct, the process varying with every variety of beer, and differing as essentially in the production of porter and pale ale as the modes of producing wine and vinegar.

The consequence of not allowing a sufficient time for the due separation of the parts of the wort and extraction of the requisite qualities of the hop must be obvious. If we proceed to the other extreme, we have every thing to apprehend from the introduction of too large a quantity of the grosser principles of the hop, which are very inimical to fermentation; and from impairing the fermentative quality of the worts themselves, by suffering their too long exposure to the action of the fire passing through them, whereby they are reduced to a more dense consistence, and their parts too intimately blended to yield to the separating force of fermentation with that ease the perfection of the product requires.

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Of Ferment-
ation.

The last step in the process of brewing is to ferment the liquor properly; for if this is not done, whatever care and pains have been taken in the other parts, they will be found altogether insufficient to produce the liquor desired. The first thing to be done here is to procure a proper ferment; for though all fermentable liquors would in time begin to ferment of themselves, yet, being also susceptible of putrefaction, the vinous and putrefactive ferments would both take place at the same time in such a manner that the product would be entirely spoiled. There are only two kinds of artificial ferments procurable in large quantity, and at a low price, *viz.* beer-yeast and wine- lees. A prudent management of these might render the business of the brewery for distillation, as in the business of the malt-distiller, &c. much more easy and advantageous*. Brewers have always found it a considerable difficulty to procure these ferments in sufficient quantities, and preserve them constantly ready for use; and this has been so great a discouragement to the business, that some have endeavoured to produce other ferments, or to form mixtures or compounds of particular fermentable ingredients: but this has been attempted without any great success, all these mixtures falling short even of common baker's leaven in their use. Whoever has a turn for making experiments and attempting improvements of this kind, will find it much easier and more advantageous to preserve and raise nurseries of the common ones, than to devise mixtures of others. Yeast may be preserved by freeing it from its moister parts. This may be done by the sun's heat, but slowly and imperfectly. The best method is by gently pressing it in canvas bags: thus the liquid part, in which there is scarce any virtue, will be thrown off, and the solid will remain behind in form of a cake, which may be packed in a barrel or box, and will keep for a long time sweet and fragrant, and fit for the finest uses; and the same me-

thod may be taken either with wine- lees, or the flowers of wine. The former may be brought from abroad with great ease in this manner: the latter may be made with us from the lees, by only dissolving them in water, and stirring them about with a stick; by this means, the lighter, more moveable, and more active part of the lees will be thrown up to the top, and may be taken off and preserved, in the manner above mentioned, in any quantity desired. By this means, an easy method is found of raising an inexhaustible fund; or a perpetual supply of the most proper ferments may be readily formed in the way of successive generation, so as to cut off all future occasion of complaint for want of them in the business of distillation. It must be observed, that all ferments abound in essential oil much more than the liquors which produce them; whence they very strongly retain the particular flavour and scent of the subject from whence they were made. It is requisite, therefore, before the ferment is applied, to consider what flavour ought to be introduced, and accordingly what species of ferment is most suited to the liquor. The alteration thus caused by ferments is so considerable, as to determine or bring over any naturally fermentable liquor of a neutral kind to be of the same kind with that which yielded the ferment. The benefit of this, however, does not extend to malt, or to any other matter that does not naturally yield a tolerably pure and tasteless spirit, as it otherwise makes not a simple, pure, and uniform flavour, but a compound and mixed one.

The greatest circumspection and care are necessary in regard to the quality of the ferment. It must be chosen perfectly sweet and fresh: for all ferments are liable to grow muggy and corrupt; and if in this case they are mixed with the fermentable liquor, they will communicate their nauseous and filthy flavour to it in such a manner as never to be got off. If the ferment is sour, it must by no means be used for any liquor; for it will communicate its flavour to the whole, and even prevent its rising to a head, and give it an acetous, instead of a vinous, tendency. When the proper quantity is got ready, it must be put to the liquor in a state barely tepid, or scarce luke-warm. The best method of putting them together, so as to make the fermentation strong and quick, is as follows. When the ferment is solid, it must be broken to pieces, and gently thinned with some of the warm liquor; but a complete or uniform solution of it is not to be expected or desired, as this would weaken its efficacy for the future business. The whole intended quantity being thus loosely mixed in some of the lukewarm liquor, and kept near the fire or elsewhere in a tepid state, free from too rude commerce with the external air, more of the insensibly warm liquor ought at proper intervals to be brought in, till thus by degrees the whole quantity is set at work together. When the whole is thus set at work, secured in a proper degree of warmth, and kept from a too free intercourse with the external air, it becomes as it were the business of nature to finish the operation.

In the operation of fermentation, however, the degree of heat employed is of the utmost consequence. In forming the extracts of the malt, the variation of a few degrees of heat produces an important difference in the effect. In the heat of fermentation, similar consequences result from similar variety. Under a certain regulation of the process, we can retain in the beer, as far as art

* See Distillation.

is capable, the finer mucilage, and thereby preserve that fulness upon the palate which is by many so much admired : on the other hand, by a slight alteration we can throw it off, and produce that evenness and uniformity of flavour which has scarce any characteristical property, and is preferred by some only for want of that heaviness which they complain of in full beers. If a more vinous racy ale be required, we can, by collecting and confining the operation within the body of the wort, cause the separation and absorption of such an abundant portion of the oleaginous and earthy principles, as to produce a liquor in a perfect state at the

earliest period, and so highly flavoured as to create a suspicion of an adventitious quality. But though all this may be done, and often hath been done, the proper management of fermenting liquors depends so much upon a multiplicity of slight and seemingly unimportant circumstances, that it hath never yet been laid down in an intelligible manner; and no rules, drawn from any thing hitherto published on the subject of brewing, can be at all sufficient to direct any person in this matter, unless he hath had considerable opportunities of observing the practice of a brewhouse.

B R I

BREY, a town of Germany, on the frontiers of Brabant, seated on a rivulet, in E. Long. 5. 35. N. Lat. 51. 6.

BREYNIA, in botany, a synonyme of the capparis. See **CAPPARIS**.

BRIANCON, a town of France, in upper Dauphiny, capital of the Brianconnois. E. Long. 6. 45. N. Lat. 44. 46.

BRIANCONNOIS, a territory of France, in Dauphiny, bounded by Grenoblois, Gapennois, Ambrunois, Piedmont, and Savoy. It comprehends several valleys, which lie among the mountains of the Alps; and though it is extremely cold, yet it is fertile in corn and pastures. The inhabitants have a great deal of wood; yet they choose to be in the stables with their cattle six months in the year, to keep themselves warm. Briancon is the capital town.

BRIAR, in botany, the English name of a species of rose. See **ROSA**.

BRIARE, a town of France, in the Gatinois, seated on the river Loire. It is remarkable for nothing but a long street full of inns and farriers, it being on the great road to Lyons; and the canal of Briare, which is 33 miles in length, and maintains a communication between the Loire and the Seine, by means of the Loing. E. Long. 2. 45. N. Lat. 47. 40.

BRIAREUS, in fabulous history, a giant; the son of Æther, Titan, or Cælus, and Terra. This was his name in heaven; on earth he was called *Ægeon*. He was of signal service to Jupiter, when Juno, Pallas, Neptune, and the rest of the gods, endeavoured to bind him in chains and dethrone him. Afterwards, however, he conspired with the rest of his gigantic brethren to dethrone Jupiter. Virgil, on this occasion, describes him as having 100 hands, 50 heads, and breathing out fire †. The fable says that Jupiter, to punish him, threw him under mount Ætna, which, as often as he moves, belches out fire. See **ÆTNA**.

BRIBE, a reward given to pervert the judgment. See the next article.

BRIBERY, (from the French *briber*, to devour or eat greedily), is a high offence, where a person in a judicial place takes any fee, gift, reward, or brokerage, for doing his office, but of the king only. But, taken largely, it signifies the receiving or offering any undue reward to or by any person concerned in the administration of public justice, whether judge, officer, &c. to act contrary to his duty; and sometimes it signifies the taking or giving a reward for a public office.

In the East it is the custom never to petition any su-

perior for justice, not excepting their kings, without a present. This is calculated for the genius of despotic countries; where the true principles of government are never understood, and it is imagined that there is no obligation due from the superior to the inferior, no relative duty owing from the governor to the governed.

The Roman law, though it contained many severe injunctions against bribery, as well for selling a man's vote in the senate or other public assembly, as for the bartering of common justice; yet, by a strange indulgence in one instance, it tacitly encouraged this practice; allowing the magistrate to receive small presents, provided they did not on the whole exceed 100 crowns a-year: not considering the insinuating nature and gigantic progress of this vice, when once admitted. Plato, therefore, in his ideal republic, orders those who take presents for doing their duty to be punished in the severest manner: and by the laws of Athens, he that offered a bribe was also prosecuted, as well as he that received a bribe. In England this offence of taking bribes is punished, in inferior officers, with fine and imprisonment; and in those that offer a bribe, though not taken, the same. But in judges, especially the superior ones, it has been always looked upon as so heinous an offence, that the chief justice Thorpe was hanged for it in the reign of Edward III. By a statute 11 Henry IV. all judges and officers of the king convicted of bribery, shall forfeit treble the bribe, be punished at the king's will, and be discharged from his service for ever. And some notable examples have been made in parliament, of persons in the highest stations, and otherwise very eminent and able, but contaminated with this forbidden vice. Thus in the reign of king James I. the earl of M. lord treasurer of England, being impeached by the commons, for refusing to hear petitions referred to him by the king, till he had received bribes, &c. was, by sentence of the lords, deprived of all his offices, and disabled to hold any for the future, or to sit in parliament; he was also fined 50,000*l*. and imprisoned during the king's pleasure. In the 11th year of king George I. the lord chancellor M—— had a somewhat milder punishment: he was impeached by the commons, with great zeal, for bribery, in selling the places of masters in chancery for exorbitant sums, and other corrupt practices, tending to the great loss and ruin of the suitors of that court; and the charge being made good against him, being before divested of his office, he was sentenced to pay a fine of 30,000*l*. and imprisoned till it was paid. It is said, that one of the p^{er}s, if not two, who voted against him, had been possi^{ble} of

Blackst.
Comment.

† Æn. x.
565.

Delivery
if
Brick.

of the office of chancellor, and sold the places of masters in chancery whenever vacant.

BRIBERY in Elections. See ELECTIONS.

BRICIANI, those of the order of that name. This was a military order, instituted by St Bridget, queen of Sweden, who gave them the rules and constitutions of those of Malta and St Augustin. This order was approved by pope Urban V. They were to fight for the burying of the dead, to relieve and assist widows, orphans, the lame, sick, &c.

BRICK, a fat reddish earth, formed into long squares, four inches broad, and eight or nine long, by means of a wooden mould, and then baked or burnt in a kiln, to serve the purposes of building.

Bricks are of great antiquity, as appears by the sacred writings, the tower and walls of Babylon being built with them.

The Greeks chiefly used three kinds of bricks; the first whereof was called [*didórón*], i. e. of two palms; the second [*tetrádórón*], of four palms; the third [*pentádórón*], of five palms. They had also other bricks, just half each of those, to render their works more solid, and also more agreeable to the sight, by the diversities of the figures and sizes of the bricks.

The dimensions of the brick chiefly used by the Romans, according to Pliny, were a foot and a half long, and a foot broad; which measures agree with those of several Roman bricks in England, which are about 17 inches long, and 11 broad, of our measure. Sir Henry Wotton speaks of a sort of bricks at Venice, of which stately columns were built; they were first formed in a circular mould, and cut, before they were burnt, into four or more quarters or sides; afterwards, in laying, they were jointed so close, and the points centered so exactly, that the pillars appeared one entire piece*. The ordinary Paris brick is eight inches long, four broad, and two thick, French measure, which makes something more than ours. But this smallness is an advantage to a building, the strength of which consists much in the multitude of angles and joints, at least if well laid, and having a good bond.

* Wotton
Elem. of
Architecture
l. ii.

Supplement
to Chambers.

Bricks among us are various according to their various forms, dimensions, uses, method of making, &c. The principal are, compass-bricks, of a circular form, used in keying of walls: concave, or hollow bricks, on one side flat like a common brick, on the other hollowed, and used for conveyance of water: feather-edged bricks, which are like common statute-bricks, only thinner on one edge than the other, and used for penning up the brick panels in timber buildings: cogging bricks are used for making the indented works under the coping of walls built with great bricks: coping bricks, formed on purpose for coping of walls: Dutch or Flemish bricks, used to pave yards, stables, and for soap-boilers vaults and cisterns: clinkers, such bricks as are glazed by the heat of the fire in making: fandel or famel-bricks, are such as lie outmost in a kiln or clamp, and consequently are soft and useless as not being thoroughly burnt: great bricks are those twelve inches long, six broad, and three thick, used to build fence-walls: plaster or buttress bricks, have a notch at one end, half the breadth of the brick; their use is to bind the work which is built of great bricks: statute-bricks, or small common bricks, ought, when burnt, to be nine inches long, four and a quarter broad, and two

and a half thick; they are commonly used in paving cellars, sinks, hearths, &c.

Worldidge, and others after him, have endeavoured to excite brickmakers to try their skill in making a new kind of brick, or a composition of clay and sand, whereof to form window-frames, chimney-pieces, door-frames, and the like. It is to be made in pieces fashioned in moulds, which, when burnt, may be set together with a fine red cement, and seem as one entire piece, by which may be imitated all manner of stone-work. The thing should seem feasible, by the earthen pipes made fine, thin, and durable, to carry water under-ground at Portsmouth; and by the earthen backs and grates for chimneys, formerly made by Sir John Winter, of a great bigness and thicknes. If chimney-pieces thus made in moulds, and dried and burnt, were not found smooth enough, they might be polished with sand and water; or were care taken, when they were half dry in the air, to have them polished with an instrument of copper or iron, then leave them till they were dry enough to burn, it is evident they would not want much polishing afterwards. The work might even be glazed, as potters do their fine earthen ware, either white, or of any other colour; or it might be veined in imitation of marble, or be painted with figures of various colours, which would be much cheaper, perhaps equally durable, and as beautiful, as marble itself.

Bricks are commonly red; though there are some also of a white colour, for which fort Walpit in Suffolk is famous. Bricks may be made of any earth that is clear of stones, even sea-oules; but all will not burn red, a property peculiar to earths which contain ferruginous particles. In England, bricks are chiefly made of a hazely, yellowish-coloured, fatty earth, somewhat reddish, vulgarly called *loam*. The earth, according to Leibourn, ought to be dug before winter, but not made into bricks before spring. For the making of such bricks as will stand the fiercest fires, Sturbridge clay or Windsor loam are esteemed the best. In general, the earth whereof bricks are made ought not to be too sandy, which would render them heavy and brittle; nor too fat, which would make them crack in drying.

The first step in the process of brickmaking is casting the clay, or earth. The next step is to tread or temper it, which ought to be performed doubly of what is usually done; since the goodness of the bricks depends chiefly upon this first preparation. The earth itself, before it is wrought, is generally brittle and dully; but adding small quantities of water gradually to it, and working and incorporating it together, it opens its body, and tinges the whole with a tough, gluey band or substance. If, in the tempering, you overwater them, as the usual method is, they become dry and brittle, almost as the earth they are made of; whereas, if duly tempered, they become smooth and solid, hard and durable. A brick of this last sort takes up near as much earth as a brick and a half made the contrary way; in which the bricks are spongy, light, and full of cracks, partly through want of due working, and partly by mixing of ashes and light sandy earth to make it work easy and with greater dispatch; as also to save culm or coals in the burning. We may add, that for bricks made of good earth, and well tempered, as they become solid and ponderous, so they take up a longer time in drying and burning than the common ones; and

and that the white efflorescence which is frequently observable on the surface of new bricks, is of an aluminous nature. The long exposure of clay to the air before it is moulded into bricks, the sulphureous exhalations of the pit-coal used for burning it, together with the suffocating and bituminous vapour which arises from the ignited clay itself, sufficiently account for the combination of a vitriolic acid with the earth of alum.

Bricks are burnt either in a kiln or clamp. Those that are burnt in a *kiln*, are first set or placed in it; and then the kiln being covered with pieces of bricks, they put in some wood to dry them with a gentle fire; and this they continue till the bricks are pretty dry, which is known by the smoke's turning from a darkish colour to transparent smoke: they then leave off putting in wood, and proceed to make ready for burning; which is performed by putting in brush, furze, spray, heath, brake, or fern-faggots: but before they put in any faggots, they dam up the mouth or mouths of the kiln with pieces of bricks (which they call *shinlog*) piled up one upon another, and close it up with wet brick-earth instead of mortar. The shinglog they make so high, that there is but just room above it to thrust in a faggot: then they proceed to put in more faggots, till the kiln and its arches look white, and the fire appears at the top of the kiln; upon which they slacken the fire for an hour, and let all cool by degrees. This they continue to do, alternately heating and slackening, till the ware be thoroughly burnt, which is usually effected in 48 hours.

About London they chiefly burn in *clamps*, built of the bricks themselves, after the manner of arches in kilns, with a vacancy between each brick, for the fire to play through; but with this difference, that instead of arching, they span it over by making the bricks project one over another on both sides of the place, for the wood and coals to lie in till they meet, and are bounded by the bricks at the top, which close all up. The place for the fuel is carried up straight on both sides, till about three feet high; then they almost fill it with wood, and over that lay a covering of sea-coal, and then overspan the arch; but they strew sea-coal also over the clamp, betwixt all the rows of bricks; lastly, they kindle the wood, which gives fire to the coal; and when all is consumed, then they conclude the bricks are sufficiently burnt.

* Vol. I. p. 392. In Dr Percival's essays *, we have the following experiment of the effects of bricks on water. "Two or three pieces of common brick were steeped four days in a bason full of distilled water. The water was then decanted off, and examined by various chemical tests. It was immiscible with soap, struck a lively green with syrup of violets, was rendered slightly lactescent by the volatile alkali, and quite milky by the fixed alkali and by a solution of saccharum saturni. The infusion of tormentil root produced no change in it." This experiment, he observes, affords a striking proof of the impropriety of lining wells with brick, a practice very common in many places, and which cannot fail of rendering the water hard and unwholesome. Clay generally contains a variety of heterogeneous matters. The coloured loams often participate of bitumen, and the ochre of iron. Sand and calcareous earth are still more common ingredients in their composition; and the experiments of Mr Geoffry and Mr Pott prove, that the earth of alum also may in large quantity be extracted from clay. Now as clay is exposed to the open air for a long space of time, is then moulded into bricks, and burnt, this process resembles in many respects that by which the alum-stone is prepared. And it is probable

that the white efflorescence which is frequently observable on the surface of new bricks, is of an aluminous nature. The long exposure of clay to the air before it is moulded into bricks, the sulphureous exhalations of the pit-coal used for burning it, together with the suffocating and bituminous vapour which arises from the ignited clay itself, sufficiently account for the combination of a vitriolic acid with the earth of alum.

Oil of Bricks, olive oil imbibed by the substance of bricks, and afterwards distilled from it. This oil was once in great repute for curing many diseases, but is now justly laid aside.

Brick-Layer, an artificer whose business is to build with bricks, or make brick work.

Bricklayers work, or business, in London, includes tiling, walling, chimney work, and paving with bricks and tiles. In the country it also includes the mason's and plasterer's business.

The materials used by brick-layers are bricks, tiles, mortar, laths, nails, and tile-pins. Their tools are a brick trowel, wherewith to take up mortar; a brick-ax, to cut bricks to the determined shape; a saw, for sawing bricks; a rub-stone, on which to rub them; also a square, wherewith to lay the bed or bottom, and face or surface of the brick, to see whether they are at right angles; a bevel, by which to cut the under sides of bricks to the angles required; a small trowel of iron, wherewith to mark the bricks; a float-stone, with which to rub a moulding of brick to the pattern described; a banker, to cut the bricks on; line-pins, to lay their rows or courses by; plumb-rule, wherewith to carry their work upright; level, to conduct it horizontal; square, to set off right angles; ten-foot rod, wherewith to take dimensions; jointer, wherewith to run the long joints; rammer, wherewith to beat the foundation; crow and pick-ax, wherewith to dig through walls.

The London brick-layers make a regular company, which was incorporated in 1568; and consists of a master, two wardens, 20 assistants, and 78 on the livery.

Brick-Laying, the art of framing edifices of bricks. Moxon hath an express treatise on the art of brick-laying; in which he describes the materials, tools, and method of working, used by brick-layers.

Great care is to be taken, that bricks be laid joint on joint in the middle of the walls as seldom as may be; and that there be good bond made there, as well as on the out-sides. Some brick-layers, in working a brick and half wall, lay the header on one side of the wall perpendicular on the header on the other side, and so fall along the whole course; whereas, if the header on one side of the wall were toothed as much as the stretcher on the other side, it would be a stronger toothing, and the joints of the headers of one side would be in the middle of the headers of the course they lie upon of the other side. If bricks be laid in winter, let them be kept as dry as possible; if in summer, it will quit cost to employ boys to wet them, for that they will then unite with the mortar better than if dry, and will make the work stronger. In large buildings, or where it is thought too much trouble to dip all the bricks separately, water may be thrown on each course after they are laid, as was done at the building the physician's college, by order of Dr Hooke. If bricks are laid in summer, they are to be covered; for if the mortar dries too hastily, it will not bind so firmly to the bricks as when left.

Brick
||
Brickgroom

left to dry more gradually. If the bricks be laid in winter, they should also be covered well, to protect them from rain, snow, and frost; which last is a mortal enemy to mortar, especially to all such as have been wetted just before the frost assaults it.

BRICK-MAKER, is he who undertakes the making of BRICKS. This is mostly performed at some small distance from cities and towns; and though some, thro' ignorance, look upon it as a very mean employ, because laborious, yet the matters about London, and other capital cities, are generally men of substance.

BRICKING, among builders, the counterfeiting of a brick-wall on plaster: which is done by smearing it over with red ochre, and making the joints with an edged tool; these last are afterwards filled with a fine plaster.

BRIDE, a woman newly married. Among the Greeks, it was customary for the bride to be conducted from her father's house to her husband's in a chariot, the evening being chosen for that purpose, to conceal her blushes; she was placed in the middle, her husband sitting on one side, and one of her most intimate friends on the other; torches were carried before her, and she was entertained in the passage with a song suitable to the occasion. When they arrived at their journey's end, the axle-tree of the coach they rode in was burnt, to signify that the bride was never to return to her father's house.—Among the Romans, the bride was to seem to be ravished by force from her mother, in memory of the rape of the Sabines under Romulus; she was to be carried home in the night-time to the bridegroom's house, accompanied by three boys, one whereof carried a torch, and the other two led the bride; a spindle and distaff being carried with her: she brought three pieces of money called asses, in her hand to the bridegroom, whose doors on this occasion were adorned with flowers and branches of trees: being here interrogated who she was, she was to answer *Caia*, in memory of *Caia Cecilia*, wife of *Tarquin the Elder*, who was an excellent *lanifica* or spinstress; for the like reason, before her entrance, she lined the door-posts with wool, and smeared them with grease. Fire and water being set on the threshold, she touched both; but starting back from the door, refused to enter, till at length she passed the threshold, being careful to step over, without touching it: here the keys were given her, a nuptial supper was prepared for her, and minstrels to divert her; she was seated on the figure of a priapus, and here the attendant boys resigned her to the *pronuba*, who brought her into the nuptial chamber and put her to bed. This office was to be performed by matrons who had only been once married, to denote that the marriage was to be for perpetuity.

BRIDEGROOM, a man newly married, the spouse of the bride.

The Spartan bridegrooms committed a kind of rape upon their brides. For matters being agreed on between them two, the woman that contrived and managed the match, having shaved the bride's hair close to her skin, dressed her up in man's clothes, and left her upon a mattress: this done, in came the bridegroom, in his usual dress, having supped as ordinary, and stealing as privately as he could to the room where the bride lay, and untying her virgin girdle, took her to his embraces; and having stayed a short time with her, returned to

his companions, with whom he continued to spend his life, remaining with them by night as well as by day, unless he stole a short visit to his bride, which could not be done without a great deal of circumspection, and fear of being discovered. Among the Romans, the bridegroom was decked to receive his bride; his hair was combed and cut in a particular form; he had a coronet or chaplet on his head, and was dressed in a white garment.

By the ancient canons, the bridegroom was to forbear the enjoyment of his bride the first night, in honour of the nuptial benediction given by the priest on that day*. In Scotland, and perhaps also some parts of England, a custom called *marchet*, obtained; by which the lord of the manor was entitled to the first night's habitation with his tenants' brides †.

BRIDEWELL, a work-house, or place of correction for vagrants, trumpets, and other disorderly persons.

These are made to work, being maintained with clothing and diet; and when it seems good to their governors, they are sent by passes into their native countries: however, while they remain here, they are not only made to work, but, according to their crimes, receive, once a fortnight, such a number of stripes as the governor commands. Yet to this hospital several hopeful and ingenious lads are put apprentices, and prove afterwards honest and substantial citizens.

BRIDGE, a work of masonry or timber, consisting of one or more arches built over a river, canal, or the like, for the convenience of passing the same.

The first inventor of bridges, as well as of ships and crowns, is by some learned men supposed to be *Janus*; their reason is, that on several ancient Greek, Sicilian, and Italian coins, there are represented on one side a *Janus*, with two faces; and on the other a bridge, or a crown, or a ship.

Bridges are a sort of edifices very difficult to execute, on account of the inconvenience of laying foundations and walling under water. The earliest rules and instructions relating to the building of bridges are given by *Leon Baptista Alberti*, *Archit.* l. viii. Others were afterwards laid down by *Palladio*, l. iii. *Serlio*, l. iii. c. 4. and *Scamozzi*, l. v. all of which are collected by *M. Blondel*, *Cours d'Archit.* p. 629, *seq.* The best of them are also given by *Goldman*, *Baukunst*, l. iv. c. 4. p. 134, and *Hawkesmoor's History of London* bridge, p. 26, *seq.* *M. Gautier* has a piece expressive on bridges, ancient and modern; *Traité des Ponts*, Paris 1716, 12mo.

The parts of a bridge are, The piers; the arches; the pavement, or way over for cattle and carriages; the foot-way on each side, for foot-passengers; the rail or parapet, which incloses the whole; and the buttments or ends of the bridge on the bank.

The conditions required in a bridge are, That it be well-designed, commodious, durable, and suitably decorated. The piers of stone-bridges should be equal in number, that there may be one arch in the middle, where commonly the current is strongest; their thickness is not to be less than a sixth part of the span of the arch, nor more than a fourth; they are commonly guarded in the front with angular sterlings, to break the force of the current: the strongest arches are those whose sweep is a whole semicircle; as the piers of bridges al-

Bridewell,
Bridge.

* *Johnf. Eccl. Law.*
an. 740.
§. 58.
† See *Marchet*.

ways diminish the bed of a river, in case of inundations, the bed must be sunk or hollowed in proportion to the space taken up by the piers (as the waters gain in depth what they lose in breadth) which otherwise conduce to walk away the foundation and endanger the piers: to prevent this, they sometimes diminish the current, either by lengthening its course, or by making it more winding; or by stopping the bottom with rows of planks, stakes, or piles, which break the current.

Among the Romans, the building and repairing of bridges was first committed to the pontifices or priests; then to the censors, or curators of the roads; lastly, the emperors took the care of bridges into their own hands. Thus Antoninus Pius built the Pons Janiculis of marble; Gordian restored the Pons Cestius; and Adrian built a new one denominated from him. In the middle age, bridge-building was reckoned among the acts of religion; and a regular order of Hospitalers was founded by St Benezet, towards the end of the 12th century, under the denomination of *pontifices*, or bridge-builders, whose office it was to be assiduous to travellers, by making bridges, settling ferries, and receiving strangers in hospitals, or houses built on the banks of rivers. We read of one hospital of this kind at Avignon, where the hospitaliers dwelt under the direction of their first superior St Benezet. The Jesuit Raynaldus has a treatise expressive on St John the bridge-builder.

Among the bridges of antiquity, that built by Trajan over the Danube is allowed to be the most magnificent. See ARCHITECTURE, n^o 138.

Among modern bridges, that of Westminster, built over the river Thames, may be accounted one of the finest in the world: it is 44 feet wide, a commodious foot-way being allowed for passengers, on each side, of about seven feet broad, raised above the road allowed for carriages, and paved with broad moor-stones, while the space left between them is sufficient to admit three carriages and two horses to go a-breast, without any danger. Its extent from wharf to wharf is 1220 or 1223 feet, being full 300 feet longer than London-bridge. The free water-way under the arches of this bridge is 870 feet, being four times as much as the free water-way left between the sterlings of London-bridge: this disposition, together with the gentleness of the stream, are the chief reasons why no sensible fall of water can ever stop, or in the least endanger, the smallest boats in their passage through the arches.

It consists of 13 large and 2 small arches, together with 14 intermediate piers.

Each pier terminates with a salient right angle against either stream: the two middle piers are each 17 feet in thickness at the springing of the arches, and contain 3000 cubic feet, or near 200 tons, of solid stone; and the others decrease in width equally on each side by one foot.

All the arches of this bridge are semicircular; they all spring from about two feet above low-water mark; the middle arch is 76 feet wide, and the others decrease in breadth equally on each side by 4 feet.

This bridge is built of the best materials; and the size and disposition of these materials are such, that there is no false bearing, or so much as a false joint in the whole structure; besides that, it is built in a neat and elegant taste, and with such simplicity and gran-

deur, that, whether viewed from the water, or by the passengers who walk over it, it fills the mind with an agreeable surprize. The semioctangular towers which form the recesses of the foot-way, the manner of placing the lamps, and the height of the balustrade, are at once the most beautiful, and, in every other respect, the best contrived.

London bridge consists of 20 locks or arches, 19 of which are open, and one filled up or obscured. It is 900 feet long, 60 high, and 74 broad, having a draw-bridge in the middle, and almost 20 feet aperture in each arch. It is supported by 18 piers, from 25 to 34 feet thick; so that the greatest water-way when the tide is above the sterlings is 450 feet, scarce half the width of the river; and below the sterlings, the water-way is reduced to 194 feet. Thus a river 900 feet wide is here forced thro' a channel of 194 feet. London bridge was first built of timber, some time before the year 994, by a college of priests, to whom the profits of the ferry of St Mary Overy's had descended; it was repaired, or rather new built of timber, in 1163. The stone-bridge was begun by king Henry in 1176, and finished by king John in 1209. The architect was Peter of Colechurch, a priest*. For the keeping it in repair, a large house is allotted, with a great number of offices, and a vast revenue in land, &c. The chief officers are two bridge-masters, chosen yearly out of the body of the livery. The defects of this bridge are the narrowness and irregularity of the arches, and the largeness of the piers, which, together with the sterlings, turn the current of the Thames into many frightful cataracts, which must obstruct and endanger the navigation through the bridge; to which may be added, the narrowness of the bridge above, occasioned by the houses built on it: but it is pretty certain that there were no houses on the bridge for upwards of 200 years; since we read of a tilt and tournament held on it in 1395. The sterlings have been added, to hinder the piers from being undermined by the rotting of the piles on which they are built: for by means of these sterlings the piles are kept constantly wet; and thus the timber is kept from decaying, which always happens when it is suffered to be alternately wet and dry.

Blackfriars bridge, situated near the centre of the city, and built according to a plan drawn by Mr Robert Mylne, is an exceeding light and elegant structure. The arches are only 9 in number; but very large, and of an elliptical form. The centre-arch is 100 feet wide; those on the sides decrease in a regular gradation; and the width of that near the abutment at each end is 70 feet. It has an open balustrade at the top, and a foot-way on each side, with room for three carriages abreast in the middle. It has also recesses on the sides for the foot passengers, each supported by two lofty Ionic columns.

The longest bridge in England is that over the Trent at Burton, built by Bernard abbot of Burton, in the 12th century; it is all of squared free stone, strong and lofty, 1545 feet in length, and consisting of 34 arches. Yet this comes far short of the wooden bridge over the Drave, which according to Dr Brown is at least five miles long.

But the most singular bridge in Europe is that built over the river Tave in Glamorganhire. It consists of one stupendous arch, the diameter of which is 175 feet,

* Harleian.
Hist. of London
bridge,
p. 6.

the chord 140, the altitude 35, and the abutments 32. This magnificent arch was built by William Edward, a poor country mafon, in the year 1756.

The famous bridge of Venice, called the *Rialto*, confifts of but a fingle arch, and that a flat or low one, and paffed for a mafterpiece of art. It was built in 1591, on the defign of Michael Angelo; the fpan of the arch is 98½ feet, and its height above the water only 23.—Poulet mentions a bridge of a fingle arch in the city of Munfter in Bothunia, much bolder than that of the Rialto at Venice. But there are nothing to a bridge in China, built from one mountain to another, confifting of a fingle arch 400 cubits long, and 500 in height, whence it is called the *flying-bridge*: a figure of it is given in the Philofophical Tranfactions. Kircher alfo fpeaks of a bridge in the fame country 360 perches long, fupported by 300 pillars.

Bridges are either built of ftone or timber, as is judged moft convenient. See ARCHITECTURE, n° 121, &c.

Ruffen BRIDGE, *Pont de jonc*, is made of large fheaves of ruffes growing in marfhy grounds, which they cover with boards or planks; they ferve for croffing ground that is boggy, miry, or rotten. The Romans had alfo a fort of fubitaneous bridges made by the foldiers, of boats, or fometimes of calks, leathern bottles, or bags, or even of bullocks bladders blown up and faftened together, called *afcofagiri*. M. Couplet gives the figure of a portable bridge 200 feet long, eafily taken afunder and put together again, and which 40 men may carry. Frezier fpeaks of a wonderful kind of bridge at Apurima in Lima, made of ropes, formed of the bark of a tree.

Pendent or Hanging BRIDGES, called alfo *Philofophical Bridges*, are thofe not fupported either by polls or pillars, but hung at large in the air, only fupported at the two ends or butments. Inflances of fuch bridges are given by Palladio and others. Dr Wallis gives the defign of a timber-bridge 70 feet long, without any pillars, which may be ufeul in fome places where pillars cannot be conveniently erected. Dr Plot affures us, that there was formerly a large bridge over the cafile-ditch at Tutbury in Staffordshire, made of pieces of timber, none much above a yard long, and yet not fupported underneath either with pillars or archwork, or any fort of prop watever.

Draw-BRIDGE, one that is faftened with hinges at one end only, fo that the other may be drawn up; in which cafe, the bridge ftands upright, to hinder the paffage of a ditch or moat.

Flying-BRIDGE, or *Pons duftorius*, an appellation given to a bridge made of pontoons, leather boats, hollow beams, calks, or the like, laid on a river, and covered with planks, for the paffage of an army.

Flying-Bridge (*pont volant*) more particularly denotes a bridge compofed of one or two boats joined together by a fort of flooring, and furrounded with a rail or balluftrade; having alfo one or more masts, to which is faftened a cable, fupported, at proper diftances, by boats, and extended to an anchor, to which the other end is faftened, in the middle of the water: by which contrivance, the bridge becomes moveable, like a pendulum from one fide of the river to the other, without any other help than the rudder.—Such bridges fometimes alfo confift of two ftories, for the quicker paffage of a great number of men, or that both infantry and

cavalry may pafs at the fame time.

In Plate LXV. is represented a flying-bridge of this kind. Fig. 2. is a perfpective view of the courfe of a river and its two banks. *a, b, c, d*, Two long boats or batteaux, which fupport the flying-bridge. *G H, K L*, two masts joined at their tops by two tranfverfe pieces, or beams, and a central arch, and fupported in a vertical pofition by two pair of fhrouds and two chains *L N, H R*. *M*, a horfe, or crofs-piece, over which the rope or cable *M, F, e, f*, that rides or holds the bridge againft the current, paffes. *E*, a roll or windlafs round which the rope *M, F, e, f*, is wound. *a, b*, The rudders. *A B*, and *C D*, two portions of bridges of boats faftened to the bank on each fide, and between which the flying-bridge moves in paffing from one fide of the river to the other. *e, f*, Chains fupported by two punts, or fmall flat-bottomed boats: there are five or fix of thefe punts at about 40 fathoms from one another. The firft, or fartheft from the bridge, is moored with anchors in the middle of the bed of the river.

Fig. 3. Is a plan of the fame bridge. *a, b, c, d*, The two boats that fupport it. *K* and *G*, the two masts. *K F G*, the tranfverfe piece or beam over which the cable paffes. *E*, the roll, or windlafs, round which the rope or cable is wound. *a, b*, The rudders. *O*, a boat. *e*, One of the punts, or fmall flat-bottomed boats that fupport the chain. *N, N*, pumps for extracting the water out of the boats. *P, P*, capfians.

Fig. 4. Lateral elevation of the bridge. *a, c*, One of the boats. *b*, The rudder. *E*, The roll, or windlafs. *M*, The horfe, or crofs-piece. *G H*, One of the masts. *E, M, H, F*, The cable. In this view the balluftrade running along the fide of the bridge is plainly exhibited.

Fig. 5. Elevation of the hinder or stern part of the bridge. *a, b*, The two boats. *G H, K L*, The two masts. *H L*, The upper tranfverfe beam. *p, q*, The lower tranfverfe beam, or that over which the cable paffes, and on which it fides from one maff to the other; this beam is therefore always kept well greafed. *p, k, q, s*, Shrouds extending from the fides of the bridge to the tops of the masts. *M*, The horfe or crofs-piece over which the cable paffes to the roll or windlafs *E*.

Bridges of boats are either made of copper or wooden boats, faftened with flakes, or anchors, and laid over with planks. One of the moft notable exploits of Julius Cæfar was the expeditious making a bridge of boats over the Rhine. Modern armies carry copper or tin boats, called *pontoons*, to be in readinefs for making bridges; feveral of thefe being joined fide by fide till they reach acrofs the river, and planks laid over them, make a plane for the men to march on. There are fine bridges of boats at Beaucaire and Rouen, which rife and fall with the water; and that at Seville is faid to exceed them both. The bridge of boats at Rouen, built in lieu of the ftately ftone-bridge erected there by the Romans, is represented by a modern writer as the wonder of the prefent age. It always floats, and rifes and falls with the tide, or as the land-waters fill the river. It is near 300 yards long, and is paved with ftone, juft as the ftreets are; carriages with the greateft burdens go over it with eafe, and men and horfes with fafety, though there are no rails on either hand. The boats are very firm, and well moored with ftrong chains, and the whole well looked after, and constantly repaired, though

Bridge. though now very old.

BRIDGE of Communication, is that made over a river, by which two armies, or forts, which are separated by that river, have a free communication with one another.

Floating-BRIDGE, is ordinarily made of two small bridges, laid one over the other, in such manner, as that the uppermost stretches and runs out, by the help of certain cords running through pulleys placed along the sides of the under-bridge, which push it forwards till the end of it joins the place it is designed to be fixed on. When these two bridges are stretched out to their full length, so that the two middle ends meet, they are not to be above four or five fathoms long; because, if longer, they will break. Their chief use is for surprising out-works, or posts that have but narrow moats. In the memoirs of the royal academy of sciences we find an ingenious contrivance of a floating bridge, which lays itself on the other side of the river.

BRIDGE, in gunnery, the two pieces of timber which go between the two transoms of a gun-carriage, on which the bed rests.

BRIDGE, in music, a term for that part of a stringed instrument over which the strings are stretched. The bridge of a violin is about one inch and a quarter high, and near an inch and a half long.

BRIDGE-Town, the capital of the island of Barbadoes, situated in W. Long. 61°. N. Lat. 13°. It stands in the inmost part of Carlisle bay. This originally was a most unwholesome situation, and was chosen entirely for its convenience for trade; but is now deemed to be as healthy as any place in the island. The town itself would make a figure in any European kingdom. It is said to contain 1500 houses, and some contend that it is the finest the British possess in America. The houses in general are well-built and finished, and their rents as high as such houses would let for in London. The wharfs and quays are well defended from the sea, and very convenient. The harbour is secure from the north-east wind, which is the constant trade-wind there; and Carlisle-bay is capable of containing 500 ships, and is formed by Needham and Pelican points. But what renders Bridge-town the safest and most desirable town in the West Indies is its security against any attacks from foreign enemies. It is defended on the west ward by James-fort, which mounts 18 guns. Near this is Willoughby's fort, which is built upon a tongue of land running into the sea, and mounts 12 guns. Needham's fort has three batteries, and is mounted with 20 guns; and St Anne's fort, which is the strongest in the island, stands more within land. In short, according to Mr Douglas, there is all along the lee-shore a breast-work and trench, in which, at proper places, were 29 forts and batteries, having 308 cannon mounted, while the windward shore is secured by high rocks, steep cliffs, and foul ground. Such was the state of the fortifications in 1717; but since that time they have been much strengthened. Bridge-town is destitute of few elegancies or conveniences of life that any city of Europe can afford. The church of St Michael exceeds many English cathedrals in beauty, largeness, and convenience; and has a fine organ, bells, and clock. Here also is a free-school for the instruction of poor boys, an hospital, and a college. The latter was erected by the society for propagating the Christian religion, in pursuance of

the will of colonel Christopher Codrington, who left about 2000*l.* a-year for its endowment, for maintaining professors and scholars to study and practise divinity, surgery, and physic. See CODRINGTON.

BRIDGENORTH, a town of Shropshire in England, seated on the river Severn, which divides it into two parts; but they are united by a handsome stone bridge, and these are called the *upper* and the *lower town*. It is said to have been built by Ethelfleda, widow of Ethelred king of the Mercians, about the year 675. Robert de Belizma, son of Robert de Montgomery, built the castle, and maintained it against king Henry I. by which means it was forfeited to the crown, and remained so till the reign of Richard III. who gave it to John Sutton lord Dudley. This town has undergone several sieges; and in the civil war it suffered very much, many fine buildings, and the whole town, being almost destroyed by fire, when Sir Lewis Kirke defended the citadel for king Charles. There are now no other remains of the castle than a small part of one of the towers, and a place yet called the *castle*, within the walls of the old one; within which stands one of the churches, dedicated to St Mary Magdalen, which was made a free chapel, and exempted from episcopal jurisdiction. The other church is at the north end of the town, on the highest part of the hill, near to whose church-yard stood a college, which was destroyed by fire in the civil wars, together with the church just mentioned; which has been since rebuilt by the inhabitants. On the west bank of the river are the remains of an ancient and magnificent convent, under which are several remarkable vaults and caverns running to a great length. Part of the cow-gate street is a rock, rising perpendicularly, in which are several houses and tenements that make a very agreeable though grotesque appearance. In many other places there are also caves and dwellings for families, in the rocks; and indeed the whole town has an appearance surprisingly singular. W. Long. 2. 30. N. Lat. 52. 40.

BRIDGEWATER, a town of Somersetshire in England, seated on the river Parret, over which there is a stone bridge, near which ships of 100 tons burden may ride with ease. It is a large, well frequented place, with the title of a duchy, and sends two members to parliament. There are in it several large inns, and the market is well supplied with provisions. W. Long. 3. 0. N. Lat. 51. 15.

BRIDLE, in the menage, a contrivance made of straps or thongs of leather and pieces of iron, in order to keep a horse in subjection and obedience.

The several parts of a bridle are the bit, or snaffle; the head-stall, or leathers from the top of the head to the rings of the bit; the fillet, over the fore-head and under the fore-top; the throat-band, which buttons from the head-band under the throat; the reins, or long thongs of leather that come from the rings of the bit, and being cast over the horse's head, the rider holds them in his hand; the nose-band, going through loops at the back of the head-stall, and buckled under the cheeks; the trench; the cavesson; the martingal; and the chaff halter.

Pliny assures us that one Pelethronius first invented the bridle and saddle; though Virgil ascribes the invention to the Lapithæ, to whom he gives the epithet *Pelethronii*, from a mountain in Thessaly named *Pelethronium*.

Bridon
Brieg.

thronium, where horses were first begun to be broken.

The first horsemen, not being acquainted with the art of governing horses with bridles, managed them only with a rope or a switch, and the accent of the voice. This was the practice of the Numidians, Getulians, Libyans, and Massilians. The Roman youth also learned the art of fighting without bridles, which was an exercise or lesson in the menage; and hence it is, that on the Trajan column, soldiers are represented riding at full speed without any bridles on.

Solding-BRIDLE. See BRANK.

BRIDON, or **SNAPPLE**, after the English fashion, is a very slender bit-mouth, without any branches. The English make much use of them, and scarcely use any true bridles except in the service of war. The French call them *bridons*, by way of distinction from bridles.

BRIDLINGTON, a sea-port town in the east riding of Yorkshire in England. It is seated on a creek of the sea near Flamborough-head, having a commodious quay for ships to take in their lading. It has a safe harbour, and is a place of good trade. It is more generally known by the name of *Burlington*, as it gives title to an earl of that name. E. Long. o. 10. N. Lat. 54. 15.

BRIDPORT, a town of Dorsetshire in England. It has a low dirty situation between two rivers, which, at a little distance, joining a small stream, formerly made a convenient harbour; but is now quite choked up with sand. It sends two members to parliament, who are chosen by the inhabitants who are housekeepers. It is noted for making of ropes and cables for shipping; whence arises a proverb of a man that is hanged, that he is *hanged by a Bridport dagger*. W. Long. 3. o. N. Lat. 50. 40.

BRIEF, in law, an abridgement of the client's case, made out for the instruction of council on a trial at law; wherein the case of the plaintiff, &c. is to be briefly but fully stated: the proofs must be placed in due order, and proper answers made to whatever may be objected to the client's cause by the opposite side; and herein great care is requisite, that nothing be omitted, to endanger the cause.

BRIEF, in Scots law, a writ issued from the chancery, directed to any judge-ordinary, commanding and authorizing that judge to call a jury to inquire into the case mentioned in the brief, and upon their verdict to pronounce sentence.

Apistolical BRIEFS, letters which the pope dispatches to princes, or other magistrates, relating to any public affair.—These briefs are distinguished from bulls, in regard the latter are more ample, and always written on parchment, and sealed with lead or green wax; whereas briefs are very concise, written on paper, sealed with red wax, and with the seal of the fisherman, or St Peter in a boat.

BRIEG, a town of Silesia in Germany, situated in E. Long. 17. 35. N. Lat. 50. 40. It might have passed for a handsome place before the last siege; the castle, the college, and the arsenal, being very great ornaments, and most of the houses very well built. But the Prussians, who besieged it in 1741, threw 2172 bombs into it, and 4714 cannon bullets, which reduced a great part of the town to ashes, and quite ruined a wing of the castle. It was obliged to surrender, after sustaining seven days continual fire. The Prussians, to

whom this place was ceded by the peace, have augmented the fortifications, and built a new suburb.—The town stands upon the Oder; on the other side of which there are plenty of fallow-deer, and large forests of beech and oak trees. They have a yearly fair, at which they sell above 12,000 horned cattle. Since 1728, they have begun to manufacture fine cloth.

BRIEL, a maritime town of the United Provinces, and capital of the island of Vuorn. It was one of the cautionary towns which was delivered into the hands of queen Elizabeth, and garrisoned by the English during her reign and part of the next. The Dutch took it from the Spaniards in 1572, which was the foundation of their republic. It is seated at the mouth of the river Meuse, in E. Long. 3. 56. N. Lat. 51. 53.

BRIESCIA, a palatinate in the duchy of Lithuania, in Poland. The name given to it by some is *Polesia*. It is bounded on the north, by Novogrode and Troki; on the west, by those of Bielsko and Lublin; on the south, by that of Chelm and upper Volhinia; and on the east, by the territory of Rzeczica. This province is of considerable extent from east to west, and is watered by the rivers Bug and Pripele: it is full of woods and marshes; and there are lakes that yield large quantities of fish, that are fished by the inhabitants, and sent into the neighbouring provinces.

BRIEUX (St), a town of France, in upper Brittany, with a bishop's see. It is seated in a bottom, surrounded with mountains, which deprive it of a prospect of the sea, though it is not above a mile and a quarter from it, and there forms a small port. The churches, streets, and squares, are tolerably handsome; but the town is without walls and ditches. The church of St Michael is in the suburb of the same name, and is the largest in the place. The convent of the Cordeliers is well built, and the garden is spacious. The college, which is very near, is maintained by the town for the instruction of youth. W. Long. 2. 58. N. Lat. 48. 33.

BRIG, or **BRIGANTINE**, a merchant-ship with two masts. This term is not universally confined to vessels of a particular construction, or which are masted and rigged in a manner different from all others. It is variously applied, by the mariners of different European nations, to a peculiar sort of vessel of their own marine. Amongst British seamen, this vessel is distinguished by having her mainmast set nearly in the plane of her keel; whereas the mainmasts of larger ships are hung athwart, or at right angles with the ship's length, and fastened to a yard which hangs parallel to the deck: but in a brig, the foremost edge of the mainmast is fastened in different places to hoops which encircle the main-mast, and slide up and down it as the sail is hoisted or lowered: it is extended by a gaff above, and a boom below.

BRIGADE, in the military art, a party or division of a body of soldiers, whether horse or foot, under the command of a brigadier.—An army is divided into brigades of horse and brigades of foot: a brigade of horse is a body of eight or ten squadrons; a brigade of foot consists of four, five, or six battalions. The eldest brigade has the right of the first line, and the second the right of the second; the two next take the left of the two lines, and the youngest stand in the centre.

BRIGADE-Major, is an officer appointed by the brigadier, to assist him in the management and ordering of his brigade.

BRIGA-

Briel
Brigade.



Fig. 5.



Fig. 4.

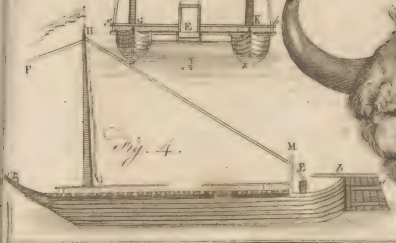


Fig. 2.

Fig. 1. Bridge.

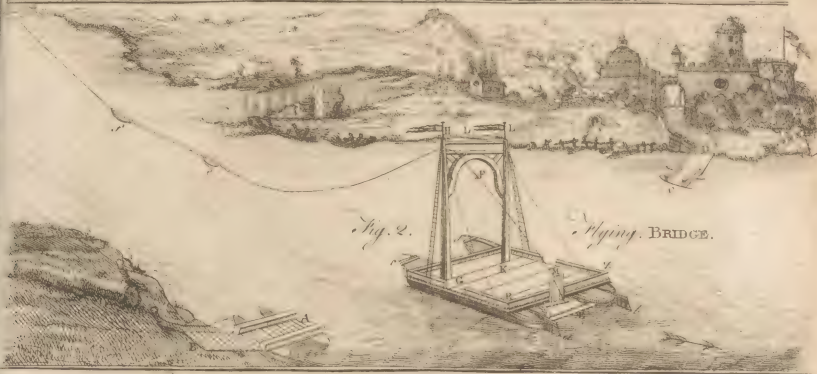


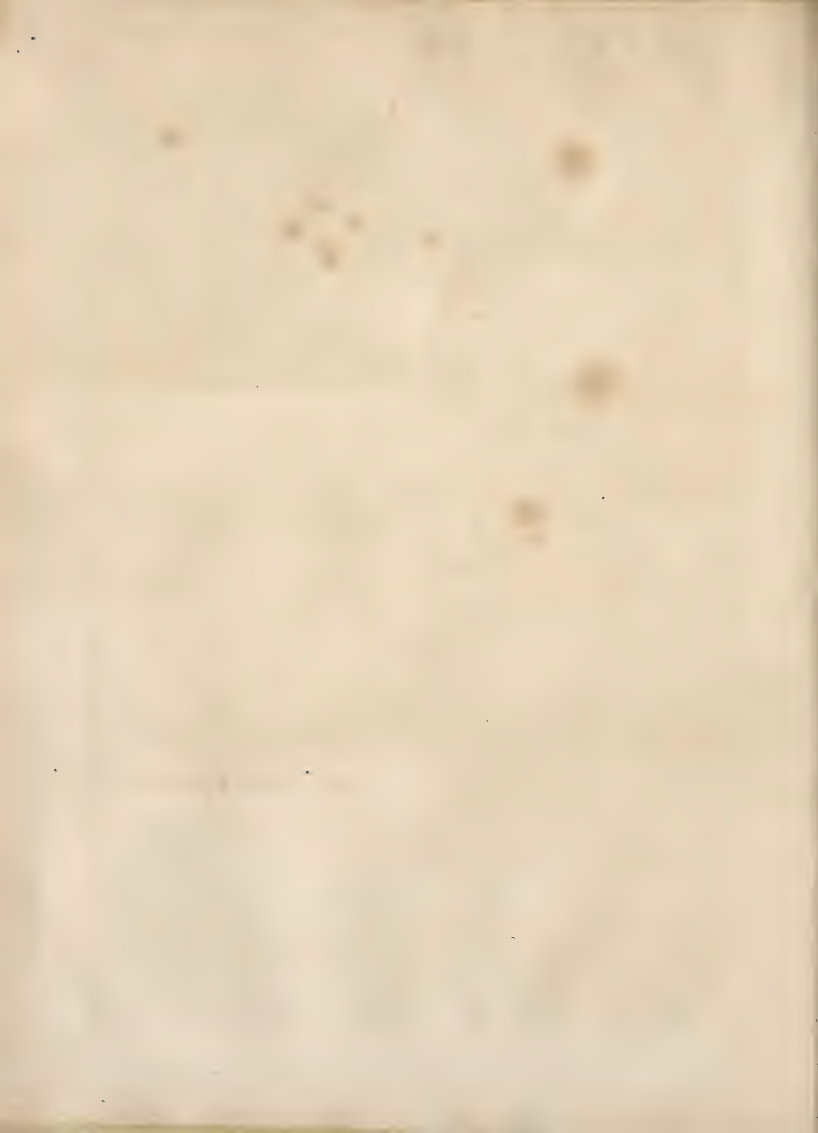
Fig. 6.



Fig. 7.



Fig. 3.



Brigadier
Briggs.

BRIGADIER, is the general officer who has the command of a brigade. The eldest colonels are generally advanced to this post. He that is upon duty is brigadier of the day. They march at the head of their own brigades, and are allowed a serjeant and ten men of their own brigade for their guard.

BRIGADIERS, or *Sub-brigadiers*, are posts in the horse-guards.

BRIGANDINE, a coat of mail, a kind of ancient defensive armour, consisting of thin jointed scales of plate, pliant and easy to the body.

BRIGANTIA, or **BRIGANTIUM**, (anc. geog.), a town of Vindelicis; now *Bregenz*, in Tyrol, at the east end of the lake of Constance*.—Another *Brigantium* in the Alpes Cottiae; which last is probably Britanncon, a town on the borders of Dauphiny†.

BRIGANTINE. See **BRIG**.

BRIGANTINUS LACUS, (anc. geog.), a lake of Rhætia, or Vindelicia which Tacitus includes in Rhætia. Ammian calls the lake *Brigantia*. It took its name either from the Brigantii, the people inhabiting on it, or from the adjoining town. Now the lake of *Constance*, or *Bodensee*.

BRIGANTINUS Portus, (anc. geog.), a port of the hither Spain; so called from Flavius Brigantium. Now *El Puerto de la Corunna*, commonly the *Groynne**.

BRIGG, by some called *Glanford Bridges*, a town of England, in Lincolnshire, seated on the river Ankam. W. Long. o. 20. N. Lat. 53. 40.

BRIGGS (Henry), one of the greatest mathematicians in the 16th century, was born at Warley Wood in the parish of Halifax in Yorkshire, in 1556. In 1592, he was made examiner and lecturer in mathematics, and soon after, reader of the physic lecture founded by Dr Linacer. When Gresham college in London was established, he was chosen the first professor of geometry there, about the beginning of March 1596. In 1609, Mr Briggs contracted an intimacy with the learned Mr James Usher afterwards archbishop of Armagh, which continued many years by letters, two of which, written by our author, are yet extant. In one of these letters, dated in August 1610, he tells his friend he was engaged in the subject of eclipses; and in the other, dated March 10th 1615, he acquaints him with his being wholly employed about the noble invention of logarithms, then lately discovered, in the improvement of which he had afterwards a large share. In 1619, he was made Savilian professor of geometry at Oxford; and resigned his professorship of Gresham college on the 25th of July 1620. Soon after his going to Oxford, he was incorporated master of arts in that university; where he continued till his death, which happened on the 26th of January 1630. Dr Smith gives him the character of a man of great probity; a contemner of riches, and contented with his own station; preferring a studious retirement to all the splendid circumstances of life. He wrote, 1. *Logarithmorum arithmetica prima*. 2. *Arithmetica logarithmica*. 3. *Trigonometria Britannica*. 4. A small tract on the north-west passage; and some other works.

BRIGGS (William), an eminent physician in the latter end of the 17th century, was the son of Augustin Briggs, Esq; four times member for the city of Norwich, where our author was born. He studied at the university of Cambridge; and his genius leading him

to the study of physic, he travelled into France, where he attended the lectures of the famous anatomist M. Vieussens, at Montpellier. After his return, he published his *Ophthalmographia* in 1676. The year following he was created doctor of medicine at Cambridge, and soon after was made fellow of the college of physicians at London. In 1682, he quitted his fellowship to his brother; and the same year, his *Theory of vision* was published by Hooke. The ensuing year he sent to the royal society a continuation of that discourse, which was published in their Transactions; and the same year, he was by king Charles II. appointed physician to St Thomas's hospital. In 1684, he communicated to the royal society two remarkable cases relating to vision, which were likewise printed in their Transactions; and in 1685 he published a Latin version of his *Theory of vision*, at the desire of Mr Newton, afterwards Sir Isaac, professor of mathematics at Cambridge, with a recommendatory epistle from him prefixed to it. He was afterwards made physician in ordinary to king William, and continued in great esteem for his skill in his profession till he died Sep. 4th, 1704.

BRIGHTHELMSTONE, a sea-port town of Suffolk in England. It is a pretty large and populous town; but ill built, inhabited chiefly by fishermen, and has a pretty good harbour. W. Long. o. 10. N. Lat. 50. 50. It was at this place king Charles II. embarked for France, 1651, after the battle of Worcester.

BRIGITTINS, or **BRIDGETTINS**, more properly *Brigittins*, a religious order, denominated from their founder St Bridget or *Birgith*, a Swedish lady in the 14th century: whom some represent as a queen; but Fabricius, on better grounds, as a princess, the daughter of king Birgenes, legislator of Upland, and famous for her revelations. The Brigittins are sometimes also called the *Order of our Saviour*; it being pretended, that Christ himself dictated the rules and constitutions observed by them to St Bridget. In the main, the rule is that of St Augustin; only with certain additions supposed to have been revealed by Christ, whence they also denominate it the *Rule of our Saviour*.—The first monastery of the Bridgetin order was erected by the foundress about the year 1344, in the diocese of Lincopen; on the model of which all the rest were formed. The constitution of these houses was very singular: though the order was principally intended for nuns, who were to pay a special homage to the holy Virgin, there are also many friars of it, to minister to them spiritual assistance. The number of nuns is fixed at 60 in each monastery, and that of friars to 13, answerable to the number of apostles, of whom St Paul made the 13th; besides which there are to be four deacons, to represent the four doctors of the church, St Ambrose, St Augustin, St Gregory, and St Jerome; and eight lay-brothers; making together, says our author, the number of Christ's 72 disciples.—The order being instituted in honour of the Virgin, the direction is committed to an abbess, who is superior not only of the nuns, but also of the friars, who are obliged to obey her. Each house consists of two convents or monasteries, separately inclosed, but having one church in common; the nuns being placed above, and the friars on the ground. The Bridgetins profess great mortification, poverty, and self-denial, as well as devotion; and they are not to possess any thing they can call their

Brightelm-
stone,
Brigittins.

Brignoles
Brimstone.

own, not much as an halfpenny; nor even to touch money on any account. This order spread much thro' Sweden, Germany, the Netherlands, &c. In England we read but of one monastery of Brigitins, and this built by Henry V. in 1413, opposite to Richmond, now called *Sion house*; the ancient inhabitants of which, since the dissolution, are settled at Lisbon. The revenues were reckoned at 1495 l. per annum.

BRIGNOLES, a town of France, in Provence, famous for its prunes. It is seated among mountains, in a pleafant country, 275 miles S. S. E. of Paris. E. Long. 6. 15. N. Lat. 43. 24.

BRIHUEGA, a town of Spain, in New Caftile, where general Stanhope with the English army were taken prisoners, after they had feperated themselves from that commanded by count Staremberg. It is feated at the foot of the mountain Tajuna, 43 miles north-eaft of Madrid. W. Long. 3. 20. N. Lat. 41. 0.

BRIL (Matthew and Paul), natives of Antwerp, and good painters.—Matthew was born in the year 1550, and ftudied for the moft part at Rome. He was eminent for his performances in hiftory and landfcapes, in the galleries of the Vatican; where he was employed by Pope Gregory XIII. He died in 1584, being no more than 34 years of age.—Paul was born in 1554; followed his brother Matthew to Rome; painted feveral things in conjunction with him; and, after his deceafe, brought himfelf into credit by his landfcapes, but efpecially by thofe which he compofed in his latter time. The invention in them was more pleafant, the difpofition more noble, all the parts more agreeable, and painted with a better gufto, than his earlier productions in this way; which was owing to his having ftudied the manner of Hanibal Carrache, and copied fome of Titian's works in the fame kind. He was much in favour with Pope Sixtus V.; and for his fuccelfor Clement VIII. painted the famous piece, about 68 feet long, wherein the faint of that name is reprefented caft into the fea with an anchor about his neck. He died at Rome in the year 1626, aged 72.

BRILLIANT, in a general fenfe, fomething that has a bright and lucid appearance.

BRILLIANT, in the menage. A brisk, high mettled, ftately horfe is called *brilliant*, as having a raifed neck; a fine motion; and excellent haunches, upon which he riles, though ever fo little put on.

BRILLIANTS, a name given to diamonds of the fineft cut. See **DIAMOND**.

BRIM, denotes the outfmoft verge or edge, efpecially of round things. The brims of velfels are made to project a little over, to hinder liquors, in pouring out, from running down the fide of the velfel. The brimming of velfels was contrived by the ancient potters, in imitation of the fupercilium or drip of the cornices of columns: it is done by turning over fome of the double matter when the work is on the wheel.

BRIM, in country affairs. A fow is faid to *brim* or *to go to brim*, when fhe is ready to take the boar.

BRIMSTONE. See **SULPHUR**.

BRIMSTONE Medals, Figures, &c. may be caft in the following manner. Melt half a pound of brimstone over a gentle fire: with this mix half a pound of fine vermilion; and when you have cleared the top, take it off the fire, ftir it well together, and it will difsolve like oil; then caft it into the mould, which fhould be

first anointed with oil. When cool, the figure may be taken out; and in cafe it fhould change to a yellowifh colour, you need only wipe it over with aqua fortis, and it will look like the fineft coral*.

BRIN, a ftrong town of Bohemia, in Moravia. It is pretty large, and well built; the afsembly of the ftates is held alternately there and at Olmutz. The caftle of Spillberg is on an eminence, out of the town, and is its principal defence. It was inveted by the king of Pruffia in 1742, but he was obliged to raife the fiege. It is near the river Swart, in E. Long. 7. 8. N. Lat. 49. 8.

BRINDISI, an ancient celebrated town of Italy, in the Terra d'Otranto, and kingdom of Naples, with an archbifhop's fee. It has a caftle built in the fea, at the entrance of the port, which is extremely ftrong, and is alfo defended by two forts. Its territory has whole forefts of olive trees. E. Long. 18. 5. N. Lat. 40. 52.

BRINE, or **PICKLE**; water replete with faline particles.

BRINE-Water, a falt water, which, being boiled, turns into falt. See **SALT**.

Brine taken out of brine-pits, or brine-pans, ufed by fome for curing or pickling of fifh, without boiling the fame into falt; and rock-falt, without refining it into white falt; are prohibited by 1 Ann. cap. xxi.

BRINE-Springs, are fountains which flow with falt-water inftead of frefh. Of thefe there are a good number in South Britain, but though not peculiar to this ifland, are far from being common in the countries on the continent. There are fome of them in feveral different countries; and perhaps, on a due fearch, others might be difcovered*. The moft remarkable of thefe already known are, one at Eaft-Chenock in Somerfetfhire, about 20 miles from the fea. Another at Leamington in Warwickfhire, very near the river Leam; which, however, is but weak. Such a fpring likewife runs into the river Cherwell in Oxfordfhire, and feveral more in Weftmoreland and Yorkfhire; but as they are but poor, and the fuel in moft of thofe countries fcarce and dear, no falt is prepared from them. At Barrowdale near Grange, three miles from Kefwick in Cumberland, a pretty ftrong fpring riles in a level near a mofs, 16 gallons of the water of which yield one of pure falt; which is the more remarkable, when it is confidered that the fame quantity of falt cannot be obtained from lefs than 22 gallons of the waters of the German ocean. At a place called *Salt-water Haugh* near Butterby in the bifhopric of Durham there are a multitude of falt fprings which rife in the middle of the river Wear, for the fpace of about 40 yards in length, and 10 in breadth; but particularly one out of a rock, which is fo ftrong that in a hot fummer's day the furface will be covered with a pure white falt. At Wefton, in Staffordfhire, there are brine pits which afford about a ninth part of very fine white falt. There are others at Enfon, St Thomas, and in the parifh of Ingeftre, but fo weak that they are not wrought; though it is believed, that by boring, ftronger fprings might be found in the neighbourhood. In Lancafhire there are feveral falt fprings, but (if we except that at Barton, which is as rich as the fpring at Norwich) by no means fo famous as thofe of Cheshire, called in general by the name of the *wiches*. Namp-
wich

Brin
Brine.

* Smith's
Laboratory,
P. 3.

* Campbell's
Political
Survey,
Vol. I. p. 76.

Brine
||
Brioude.

which on the river Weever, has a noble spring not far from the river, which is so rich as to yield one sixth part of pure white salt. At six miles distance stands Northwich, at the confluence of the Weever and the Dan; where the brine is still richer, since they obtain six ounces of salt from 16 of water. There are, even at this day, some visible remains of a Roman causeway between these two towns. The inhabitants of Wales, who, before that country was incorporated into England, were supplied chiefly, if not solely, with that necessary commodity from these two towns, called the former *Hellath Wen*, and the latter *Hellath Du*; i. e. the white and black salt pit. In 1670, a rock of salt was discovered at a small distance from Northwich, which has been wrought to a great depth, and to a vast extent, so as to be justly esteemed one of the greatest curiosities in England; and it is highly probable, that there is an immense body of fossil salt in the bowels of the earth, under this whole county; since, upon boring, brine-pits have been found in many places on both sides the river Weever. This is the more likely, since, at Middlewich, which stands at the confluence of the Croke and the Dan, there are salt-springs with a fresh brook running between them. The brines from these pits are of unequal strength; but, when mixed, they commonly obtain four ounces of salt from a pound of brine. Experience shews, that in these springs the water is strongest nearest the bottom, richer in dry weather than in wet, and when long drawn than when first wrought. But there are no rules in respect to other salt-springs, since in those of Franche Comte the brine is strongest in wet weather. There are several other bodies dissolved in these brines besides salt; in some a sulphureous substance, which sublimates as the brine heats; a sort of dirty ochre which discolours the brine, but, if suffered to stand, speedily subsides; and in most brines a calcareous, or rather selenitic earth, which settles to the bottom of the pans.*

* See Salt,
and Springs.

To BRING-TO, in navigation, to check the course of a ship when she is advancing, by arranging the sails in such a manner, that they shall counteract each other, and prevent her either from retreating or moving forward. In this situation the ship is said to lie by, or lie to; having, according to the sea-phrases, some of her sails *aback*, to oppose the force of those which are full; or having them otherwise shortened by being *furlled*, or *hauled up in the brails*.

BRINGING-TO, is generally used to detain a ship in any particular station, in order to wait the approach of some other that may be advancing towards her; or to retard her course occasionally near any port in the course of a voyage.

BRINGING-in a Horse, in the menage, the same as to say, keep down the nose of a horse that boars and tosses his nose in the wind: this is done by means of a branch.

BRIONNE, a town of France, in Normandy, seated on the river Rille. E. Long. 0. 51. N. Lat. 49. 51.

BRIOUDE, a town of France, in lower Auvergne. There are two Brioudes, three quarters of a mile from each other; the one is called *Church Brioude*, the other *Old Brioude*. The houses are built after the antique manner, and are badly disposed. The canons are all temporal lords and counts. It is in no diocese, but depends immediately on the Pope. There are several con-

vents; and, among the rest, the church of St Ferrol, which is highly celebrated. Near the Old Town is a stone-bridge on the river Allier, which consists of one arch: this is esteemed a stupendous structure, and is thought to be a work of the Romans. The inhabitants have no manufactures. It is situated in E. Long. 3. 25. N. Lat. 45. 14.

BRIQUERAS, a town in Piedmont, seated in the valley of Lucern, three miles from the town of that name, and four fourth of Pignerol. It had a very strong castle towards the latter end of the 16th century; but when the French got footing in it, it was ruined, that is, before they delivered it up to the duke of Savoy in 1696. E. Long. 7. 24. N. Lat. 44. 41.

BRISACH, a town of Germany, and capital of Brisgaw. It was twice in possession of the French; but restored to the house of Austria, in consequence of treaties of peace. It was a very strong place, but the fortifications have been demolished. It is seated on the Rhine, where there is a bridge of boats. E. Long. 7. 49. N. Lat. 48. 5.

BRISACH (New), a town of France, in Alsace, built by order of Lewis XIV. over against Old Brisach, and fortified by Vauban. It is 32 miles south of Strasburg. E. Long. 7. 46. N. Lat. 48. 5.

BRISEIS, or HIPPODAMIA, in fabulous history, the wife of Mynes king of Lyrnessa. After Achilles had taken that city, and killed her husband, she became his captive. That hero loved her tenderly; but Agamemnon taking her from him, she became the accidental cause of numberless disorders in the Grecian army. Achilles, enraged, retired to his tent; and, till the death of Patroclus, refused to fight against the Trojans. The resentment of this prince is finely painted in the *Iliad*.

BRISGAW, a territory of Germany, in the circle of Suabia, on the eastern banks of the Rhine, about 50 miles in length, and 30 in breadth. The principal places are Old Brisach, New Brisach, Freyburgh, Rhinmarck, and an island in the Rhine.

BRISNOT (Peter), one of the ablest physicians of the 16th century, was born at Fontenai le Comte in Poitou. He studied at Paris; and, having taken his doctor's degree, bent his thoughts to the reforming of physic, by restoring the precepts of Hippocrates and Galen, and exploding the maxims of the Arabians: to this purpose he publicly explained Galen's works, instead of those of Avicenna, Rhasis, and Mesuie. He afterwards resolved to travel to acquire the knowledge of plants; and going to Portugal, practised physic in the city of Ebora. His new method of bleeding in pleurisy, on the side where the pleurisy was, raised a kind of civil war among the Portuguese physicians; it was brought before the university of Salamanca, who at last gave judgment, that the opinion ascribed to Brissot was the pure doctrine of Galen. The partisans of Delys, his opponent, appealed in 1529 to the emperor, to prevent the practice, as being attended with destructive consequences; but Charles III. duke of Savoy happening to die at this time of a pleurisy, after having been bled on the opposite side, the prosecution dropped. He wrote an Apology for his practice; but died before it was published, in 1552: but Anthony Linceus, his friend, printed it at Paris three years after. Renatus Moreau procured a new edition of it at Paris in.

Briqueras
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Brissot.

Bristol.
Bristol.

in 1622; and annexed to it a treatise entitled *De missione sanguinis in pleuritide*, together with the Life of Bristol.

BRISTLE, a rigid glossy kind of hair found on swine, and much used by brush-makers, &c.

BRISTOL, a city of England, and inferior to none, except London, for wealth, trade, and number of inhabitants. Bristol is a corruption of *Brightflow*, as it was called by the Saxons. It is thought to have stood anciently altogether on the west or Somersetshire side of the Avon, before the bridge was built; but after that, it came to be partly in Somersetshire, and partly in Gloucestershire, until it was made a county of itself, though even before that, in the parliament rolls, it was always placed in Somersetshire. At present, the east side is by much the largest and most populous. It had anciently a castle, built by Robert earl of Gloucester, natural son to Henry I. which was demolished by Cromwell; and the ground is now laid out into streets. The corporation consists of a mayor; recorder; twelve aldermen, of whom the recorder is one; two sheriffs; and twenty-eight common-council men. The recorder is generally a scribe at law, and fits as judge in capital and all other criminal causes. The mayor, to support his dignity, and defray his extraordinary expence, is entitled to certain fees from ships, which long ago amounted to 500 or 600*l*. Besides the cathedral, which was anciently the church of the Augustine monastery, there are 18 parish churches. Here are dissenters of all denominations, of whom the quakers are very respectable both for their wealth and numbers. When Henry VIII. dissolved the monastery, he applied its revenues to the maintenance of a bishop, dean, six prebendaries, and other officers. Of the parish churches, St Mary Ratcliff is reckoned one of the finest, not only here, but in the whole kingdom. In this church, besides two monuments of the founder William Cannings, who had been five times mayor of this city, one in the habit of a magistrate, and another in that of a priest (for in his latter days he took orders), there is one of Sir William Penn, father to the famous quaker. The old bridge over the Avon consisted of four broad arches, with houses on both sides like those formerly on London bridge; but this has been lately pulled down, and another erected in its place. No carts or waggons are admitted into Bristol, for fear of damaging the vaults and gutters made under ground for carrying the filth of the city into the river. Queen's-square, in this city, is larger than any in London, except Lincoln's-inn-fields, and has in the centre an equestrian statue of king William III. All the gates of the city remain entire, and a part of the walls; the rest were razed in the reign of William Rufus. It is almost as broad as long, about seven miles in circumference, and contains about 95,000 inhabitants. Of the hospitals, the chief are, 1. That called Queen Elizabeth's, in which 100 boys are taught reading, writing, arithmetic, and navigation; six of whom, when they go out, have 10*l*. and the rest 8*l*. 8*s*. to bind them apprentices: the matter is allowed 450*l*. a-year for the maintenance of the boys. 2. Colston's hospital; in which 100 boys are maintained for seven years, and taught and apprenticed, as in queen Elizabeth's. 3. Another founded by the same gentleman in 1691, for 12 men and 12 women, with an allowance of 3*s*. per week, and 24 sacks of coals

in the year. This charity cost the founder 25,000*l*.

4. Another founded partly by Mr Colston, and partly by the merchants, in which 18 men on account of the merchants, and 12 men and women on account of Mr Colston, are maintained. 5. An infirmary, which was opened in 1736 for the sick, lame, and distressed poor of the city, which is maintained by subscription, besides 5000*l*. bequeathed to it by John Eldridge, Esq; formerly comptroller of the customs at this port. There are, besides these, a bridewell, several alms-houses, and charity-schools. There is also a guildhall for the sessions and assizes; the mayor's and sheriff's courts; a council-house, where the mayor and aldermen meet every day, except Sundays, to administer justice; a handsome new exchange, with three entrances, about two thirds as large as that in London; and a key half a mile in length, the most commodious in England for shipping and landing goods, for which purpose it is provided with several cranes. In College-green is a stately high cross, with the effigies of several kings round it. In Winch-street is a guard-house, with barracks for soldiers. As to the trade of this city, it was computed many years ago to be much greater in proportion, especially to America and the West Indies, than that of London. Fifty sail, some of them ships of considerable burden, have arrived here at one time, or very near one another, from the West Indies. For this trade, and that to Ireland, it is much better situated than London, besides the great advantages it possesses of an inland navigation by the Wye and Severn. Their trade extends to the Baltic, Norway, Holland, Hamburgh, Guinea, and the Streights. The largest ships are discharged at Hungford, four miles below the city, and the goods are brought to the key by lighters. For building, equipping, and repairing ships, there are docks, yards, rope-walks, and ship-wrights. Here are some considerable woollen manufactures; and no less than 15 glass-houses, for which Kingwood and Mendip furnish the coals. The city companies are 13: 1. The merchant adventurers. 2. The merchant tailors. 3. The mercers. 4. The soap-boilers. 5. The tobaccoconists. 6. The butchers. 7. The barbers. 8. The tylers. 9. The holliers, who are the sled-men. 10. Shoemakers. 11. Coopers. 12. Bakers. 13. Smiths. For supplying the city with water there are six public conduits; and handsome hackney-coaches may be hired at very reasonable rates, but they do not ply in the streets. There are also stage-coaches, which set out every day for Bath, London, and other places. A mile below the city, close by the river, is the hot well, whose waters are specific for the diabetes, and good in phthical, scorbutic, and inflammatory disorders. Hither is a great resort in the summer of invalids, as well as other company; for whose accommodation and entertainment there is a pump-room, ball-room, coffee-house, with taverns, and a great number of elegant lodging-houses, both below on a level with the well, and above in the delightful village of Clifton, which is situated on the brow of a hill, from whence there are downs extending several miles, where the company ride out for exercise. Nothing can be more pure and salutary than the air of these downs, which afford a variety of the most romantic and agreeable prospects, comprehending Kingroad, with the ships at anchor, the mouth of the Severn, and the mountains of Wales. In the rocks above the well are

Bristol.

found

Bristol,
Britain.

found those six-cornered stones called *Bristol stones*; but they are not so plentiful now as in Camden's days, when, he says, whole bushels might have been easily gathered. In this city is a theatre, where plays are acted almost every night during the recesses of the comedians from the metropolis. There are two annual fairs, to which the concourse is so great, that the neighbouring inns have filled 100 beds a-piece with their guests. In the winter season there is an assembly every Thursday for the gayer part of the citizens of both sexes. About half way betwixt Bristol and Bath, at a place called *Warmly*, a company of Bristol merchants have erected a noble manufacture of pins and other brass utensils, which employs a great number of hands, including above 200 children of both sexes from seven to twelve or thirteen years of age. All the different operations of melting, splitting, drawing, hammering, turning, &c. are performed by wheels worked with water, which is raised by two fire-engines of a very curious mechanism. The city of Bristol gives the title of earl to the family of Hervey. It is worth observing, that whoever marries a citizen's daughter becomes free of the city.

New Bristol, the capital of the county of Bucks in Pennsylvania, situated on the river Delaware, about 20 miles north of Philadelphia, in W. Long. 75°. N. Lat. 40. 45.

Bristol Water. Of the four principal warm waters naturally produced in England this is the least so. As the Bath waters are proper where the secretions are defective, so the Bristol water is of service where they exceed the requirements of health. The Bath water warms; the Bristol cools. Bath water helps the stomach, intestines, and nerves; the Bristol favours the lungs, kidneys, and bladder. Except a jaundice attend, the Bristol water may be of use in dropies by its drying and diuretic qualities. Dr Wynter asserts, that there is no iron in the Bristol water; and that its mineral contents are chalk, lapis calcaris, and calaminaris. Five gallons of this water, after evaporation, afforded only 3 iii. and gr. ii. of a mineral-like substance. The diseases in which this water is useful are internal hæmorrhages, immoderate menses, internal inflammations, spitting blood, dysentery, purulent ulcers of the viscera, consumption, dropsy, scurvy with a slow, stone, gravel, strangury, habitual gout, atrophy, a heat fever, scrophula, gleet, and a diabetes, in which last it is a specific, and may be drank as freely as the thirst requires it. The hotter months are the best for using it. The Bristol and Matlock waters are of exactly the same qualities.

Doctors Mead and Lane first established the reputation of Bristol waters in diseases of the kidneys and bladder.

BRITAIN, or *GREAT BRITAIN*, the most considerable of all the European islands, extends from the Lizard Point, in the latitude of about 50°. to Dunefbay-head in latitude 58. 30. N. or, taking it in a straight line from north to south, about eight degrees or 550 miles; and from Dover-head on the east to Land's-end on the west comprehends about seven degrees of longitude, which may be computed at about 290 miles: but the form being very irregular, and lessening continually towards the north, proper allowances must be made in computing its dimensions.

The ancient name of this island was *Albion*, the name
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Britain being then common to all the islands round it. Hence Agathemerus, speaking of the British islands, "They are many in number (says he); but the most considerable among them are Hibernia and Albion." And Ptolemy, to the chapter wherein he describes the island now called *Great Britain*, prefixes the following title: "The situation of *Albion* a British island." But as this far excelled the other British islands, the name of *Albion* in process of time was laid quite aside, and that of *Britain* used in its stead. By this name it was known in Pliny's time, and even in Cæsar's. The origin of both these names is very uncertain. Some derive that of *Albion* from the Greek word *alphen*, which, according to Festus, signifies *white*, the chalky cliffs that in several places rise on the southern coasts having that colour; while others pretend this name to have been borrowed from a giant feigned to have been the son of Neptune, and mentioned by several ancient authors. Some etymologists have recourse to the Hebrew, and others to the Phœnician; *alben* in the former signifying *white*, and *alp* in the latter signifying *high*. The origin of the name *Britain* is no less uncertain than that of *Albion*. Nennius and some other British writers derive it from Brutus, whom they likewise call *Brifo*, the fifth in descent from the celebrated Æneas. Others derive it from the British words *pyd cain*, that is, a *white form*, softened by degrees into *Britannia*. Camden derives it from the word *brith*, which, in the ancient language of the island, signifies *painted*; and *tania*, importing, in Greek, a region or country; so that the word *Brithania*, changed in process of time into *Britannia*, expresses what the Britons really were, that is, *painted*. Somner, disliking Camden's etymology, proposes another, viz. that the name *Britain* comes from *brydis*; signifying, in the British tongue, *rage*, and pointing out the violent motion of the sea that surrounds the island. Mr Whittaker, in his History of Manchester, derives it from the word *brith*, *briet*, *brit*, *bris*, or *brig*, which, he says, signifies *divided* or *striped*. Against the first of these etymologies it may be objected, that it is founded on a fable: and against the other four lies one common and unanswerable objection; which is, that the name of *Britain* was given to the island by foreigners, who could not borrow it from the British tongue, with which they were in all likelihood unacquainted. That the island received the name of *Britain* from foreigners is evident, since the natives never styled themselves *Britons*, nor their country *Britain*; their true name being *Cumri*, or *Cumbriz*; whence *Cambria* the name of Wales to this day among the Welsh.

The learned Bochart, speaking of the colonies and language of the Phœnicians, offers a conjecture which most of our modern writers have adopted as the most natural. The Phœnicians, according to that writer, called this island, and some others near it, *Earat Anac*, that is, *the land or country of tin or lead*, and more contractedly *Bratanae*; which name, passing from the Phœnicians to the Greeks, and from these to the Romans, might have been softened into that of *Britannica* and *Britannia*. That the Phœnicians first discovered these islands, which were afterwards by the Greeks called *Cassiterides*, and are proved by Camden to be our Scilly islands, appears both from Strabo and Pliny; of whom the former tells us, that the Phœnicians first brought tin from the Cassiterides, which they sold to the Greeks; but

2
Origin of
the different
names.

3
Bochart's
opinion.

4
Albion the
ancient
name.

Britain.

but kept the trade to themselves, and the place private: and the latter writes, that Medicoritus was the first who brought lead from the Casterides; where Bochart shews that we ought to read *Melichartus*, who is the Phœnician Hercules of Sanchoniatho, to whom that nation ascribe their first western discoveries. But, notwithstanding the care of the Phœnicians to conceal these islands, the Greeks at last discovered them; and gave them the name of *Casterides*, which, in the Greek tongue, signifies the same with *Barat Anac* in the Phœnician. This name was at first given to the islands of Scilly already mentioned, but by degrees communicated to all the others lying in the same sea. Thus Bochart. But after all, his opinion, however plausible in appearance, may be as foreign to the purpose as any of the rest; many instances of names given to new-discovered countries shewing that the origin of such names is not always owing to reason, but often to chance or caprice.

The general division of Britain is into SCOTLAND, ENGLAND, and WALES; for a particular description and history of which, see these articles.

^a James VI. of Scotland succeeds to the crown of England.

In the year 1603, the kingdoms of Scotland and England fell under the dominion of one sovereign, by the accession of James VI. of Scotland to the throne of England also. He derived his title to the latter from being the grandson of Margaret eldest daughter to Henry VII. of that kingdom; and, on the failure of all the male line, his hereditary right remained incontestable. Queen Elizabeth, with her latest breath, had recognized him for her successor; so that few sovereigns ever ascended a throne with more approbation of their subjects, or greater hopes of a peaceable and happy reign.

Those hopes, however, were soon blasted; and the history of this monarch's reign consists of little else than a detail of disputes and contentions between him and his parliament. A particular and minute account of such transactions could afford very little entertainment; but it is of importance to know their origin, as they are to be reckoned the ultimate causes of those succeeding events which make so conspicuous a figure in the annals of Britain.

⁵ General state of the nation at that time.

In those barbarous ages which preceded the period we are now entering upon, the human mind, enervated by superstition, and obscured by ignorance of every art and science, seemed to have given up all pretensions to liberty either religious or civil. Unlimited and uncontrolled despotism prevailed every where; and though England suffered less in this respect than almost any other nation, the many examples of arbitrary power exerted by her sovereigns, queen Elizabeth herself, James's immediate predecessor, not excepted, shew that they were very far from being then a free people. An incontestable proof of this, and an evidence how little restraint at that time the people could lay upon the authority of the sovereign, is, that the proceedings of parliament were accounted, even by themselves, of so little consequence, that they were not at the trouble to keep journals of them. It was not till the year 1607, four years after the accession of James, that parliamentary journals were kept, at the motion of Sir Edwin Sandys, a member of great authority in the house.

⁶ Parliaments of little consideration.

The proceedings of the parliament being at that time of so little consequence, it is no wonder that the sessions

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were not regular, or that little attention was paid to the choice or continuance of the members. In the reign of Elizabeth, and her predecessors, the sessions of parliament did not continue above the twelfth part so long as the vacations. It was then usual, after parliaments had been prolonged beyond one session, for the chancellor to exert a discretionary authority of issuing new writs to supply the place of any members whom he judged incapable of attending, either on account of their employment, sickness, or other impediment. No practice could be more dangerous to liberty than this, as it gave the chancellor, and consequently the sovereign, an opportunity of garbling at pleasure the representatives of the nation: yet so little was liberty at that time understood, that the commons, of their own accord, without the least court influence or intrigue, and contrary to some former votes of their own, confirmed the chancellor's power in this respect in the 23^d of Elizabeth. Nor did they proceed any farther in the assertion of their privileges, than to vote, that "during the sitting of parliament there do not, at any time, any writ go out for the chusing or returning any member without the warrant of the house."

Towards the end of the 16th or beginning of the 17th century, a great revolution took place, though insensibly, throughout all Europe. Arts and sciences began to flourish, commerce and navigation were greatly extended, and learning of all kinds began to diffuse itself. By more enlarged views, the love of freedom began, in England especially, to take place in the breasts of most people of birth and education; and this was greatly promoted by an acquaintance with the ancient Greek and Latin historians. From the example of the republics of Greece and Rome, whose members had so often sacrificed their lives for the sake of liberty, a patriotic spirit began to arise; and a desire of circumscribing the excessive prerogative and arbitrary proceedings of the crown began secretly to take place throughout the nation.

Nor was this desire unreasonable, or without a solid foundation. During the last years of queen Elizabeth's reign, the commerce, navigation, and number of seamen in England, had sensibly decayed. A remonstrance from the Trinity-house in 1602 says, that, since 1588, the number of seamen and shipping had decayed about a third part. Every species of domestic industry was fettered by monopolies; and by exclusive companies, which are only another species of monopoly, almost all foreign trade, except that to France, was brought into the hands of a few rapacious engrossers, and all prospect of future improvement in commerce was for ever sacrificed to a little temporary advantage of the sovereign. These companies, though arbitrarily erected, had carried their privileges so far, that almost all the commerce of England centered in London; the customs of that port alone amounted to 110,000*l.* a-year; while those of all the kingdom beside amounted only to 17,000*l.*; nay, the whole trade of London was confined to about 200 citizens, who were easily enabled, by combining among themselves, to fix whatever price they pleased both on the exports and imports of the nation. Besides this, the subjects were burdened by wardships and purveyances. The latter was an old prerogative of the crown, by which the officers of the household were empowered to take, without consent of the owners, pro-

⁷ Origin of the patriotic party.

⁸ Grievances the nation at that time laboured under.

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provisions for the king's family, and carts and horses for the removal of his baggage, upon paying a stated price for them. The king had also a power of sending any person, without his consent, on whatever message he pleased; and thus he could easily force any individual to pay him whatever money he chose, rather than be sent out of the country on a disagreeable errand. Money extorted from individuals, by this or any other method, was called a *benevolence*.

These were some of the grievances under which the nation at this time laboured, and these the rising spirit of patriotism tended to redress. This disposition, however, the severe government of Elizabeth had confined within very narrow bounds: but when James succeeded to the throne; a foreign prince, less dreaded and less beloved; symptoms of a more free and independent genius immediately appeared. Happily James neither perceived the alteration, nor had sufficient capacity to check its early advances. He had established in his own mind a speculative system of absolute government, which few of his subjects, and none but traitors and rebels, he thought, would make any scruple to admit. He considered himself as intitled to equal prerogatives with other European sovereigns, not considering the military force with which their despotism was supported. The almost unlimited power which, for upwards of a century, had been exercised by the English sovereigns, he considered as due to royal birth and title, not to the prudence and spirit of those monarchs, or the conjunctures of the times. In his person, therefore, he imagined all legal power to be centered by an hereditary and a divine right; nay, so fully was he persuaded that he was the absolute proprietor of his subjects, that in his speech to the parliament in 1621, he told them, that he "wished them to have said that their privileges were derived from the grace and permission of him and his ancestors." And when the same parliament protested that "the liberties, franchises, privileges, and jurisdictions of parliament, are the ancient and undoubted birthright and inheritance of the subjects of England," he was so enraged, that sending for the journals of the commons, he with his own hand, before the council, tore out this protestation; and ordered his reasons to be inserted in the council-book.

Such were the opposite dispositions of the prince and parliament, at the commencement of the Scottish line; dispositions just beginning to exist and to appear in parliament, but thoroughly established, and openly avowed on the part of the king, throughout his whole reign.

The consequence of such opposite dispositions prevailing in the king and parliament was, that during this reign the prerogatives of the crown were violently and openly attacked; but the chief grounds of discontent were money, and religion. The king's high notions of the royal prerogative made him imagine he had a right to whatever sums he pleased to demand; and his profusion caused him to dissipate in a short time the scanty supplies he could extort from the parliament, who seem to have behaved as unreasonably on the one hand, as James himself did on the other. With regard to religious matters, the nation was at that time greatly infected with puritanism. Though the severities of Elizabeth had almost totally suppressed the Papists, it had been otherwise with the Puritans. So much had they increased by the very means which had diminished

the number of catholics, that no less than 750 clergymen of that persuasion signed a petition to James on his accession. They hoped that the king, having received his education in Scotland, and having always professed an attachment to the church established there, would at least abate the rigour of the laws enacted against the Puritans, if he did not shew them particular favour and encouragement. But in this they were mistaken. He had observed in their Scots brethren a violent turn towards republicanism, and a zealous attachment to civil liberty. In the capacities both of monarch and theologian, he had experienced the little complaisance they were disposed to shew him. They controuled his commands; disputed his tenets; and to his face, before the whole people, censured his conduct and behaviour. This superiority assumed by the presbyterian clergy, the monarchic pride of James could never digest. Tho' he had been obliged while in Scotland to court their favour, he treasured up, on that account, the stronger resentment against them; and was determined to make them feel, in their turn, the weight of his authority. He therefore not only rejected the petition of the 750 clergymen abovementioned, but throughout his whole reign refused to relax in the least the severity of the laws against Protestant nonconformists, though very often petitioned in their favour by his parliaments.

The same principles which occasioned in James such an aversion to the Puritans, prompted him greatly to favour the episcopals, and even the Papists, as being greater friends to despotism. In his youth he had been suspected of a bias towards the religion of the latter; and when he ascended the throne of England, it is certain he often endeavoured to procure some mitigation of the laws against them, if not an absolute toleration. But in this he was as constantly opposed by the parliament; and indeed the strong inclination shewn by James to establish episcopacy throughout every corner of his dominions, tended very much to alienate the minds of the generality of his subjects, especially in Scotland, entirely from him.

In May 1617, the king set out for Scotland, expressly with the design of establishing episcopacy in that kingdom. He did not, however, propose to abolish presbytery entirely, and set up absolute episcopacy in its room. He designed to content himself with establishing the royal authority above the ecclesiastical, and introducing some ceremonies into the public worship, such as kneeling at the sacrament, private communion, private baptism, confirmation of children, and the observance of Christmas, &c. But as his design was fully seen from the beginning, every advance towards episcopacy gave the greatest discontent, and those trivial ceremonies were rejected as so many mortal sins.

At this time the power of the Scots clergy was exceedingly great; and the gloomy enthusiastic spirit with which they were actuated, prompted them to exercise it in such a manner as to make their tyranny insupportable to those who were of a different way of thinking from themselves. Every ecclesiastical court possessed the power of excommunication; which was then attended with some very serious temporal consequences, besides the spiritual ones which were supposed to flow from it. The person excommunicated was shunned by every one as profane and impious; his whole estate during his life-time, and all his moveables for-ever, were

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12
He favours
the episcopals
and Papists.

13
Attempts to
establish e-
piscopacy in
Scotland.

14
Tyranny of
the Scots
clergy.

9
James's ar-
bitrary sy-
stem of go-
vernment.

10
Reasons of
the dissen-
sions be-
tween the
king and
parliament

11
Aversion of
James to the
puritans.

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forfeited to the crown. A sentence of excommunication was sometimes pronounced in a summary manner, by any ecclesiastical court however inferior, against any person, whether he lived within the bounds of their jurisdiction or not. And by this means, the whole tyranny of the inquisition, though without its orders, was introduced into Scotland. But the clergymen were not satisfied with this unbounded authority in ecclesiastical matters: they assumed a censorial power over every part of administration; and, in all their sermons, and even prayers, mingling politics with religion, they inculcated the most seditious and turbulent principles. One Black, a minister of St Andrews, went so far as to pronounce, in one of his sermons, that all kings were the devil's children; and in his prayer for the queen he used these words, "We must pray for her for the fashion's sake, but we have no cause: she will never do us any good." Another minister preaching in the principal church of that capital, said, that the king was possessed with a devil; and, that one devil being expelled, seven worse had entered in his place. To which he added, that the subjects might lawfully rise, and take the sword out of the hands of their sovereign.

15
Anecdotes
of some of
them.

16
The king's
design mis-
gives in
Scotland.

We can scarce wonder that James should be desirous of subjugating such rebellious and turbulent spirits as these; and, on the other hand, considering the extreme weakness of this monarch's understanding, and that he imagined himself able to manage not only furious religionists, but even the most powerful foreign nations, with no other weapon than mere argumentation, we can as little wonder at his want of success.—In short, so far was James from being able to establish his royal authority above the ecclesiastical, that he found himself unable to introduce a single ceremony. He returned therefore with the mortification not only of seeing his schemes entirely baffled with regard to Scotland, but of having disgusted even the few of that nation over whom religious prejudices did not prevail: for they, considering the ceremonies so much insisted on by the king as trivial and insignificant, could not help thinking the national honour sacrificed by a servile imitation of the modes of worship practised in England, and that their sovereign betrayed equal narrowness of mind, though in an opposite manner, with those he so much condemned.

17
His bad suc-
cess against
the puritans
in England.

The like bad success attended James when he attempted some opposition to the puritanical innovations in England. He had observed in his progress through that kingdom, that a Judaical observance of the Sunday gained ground every day: and that by this means, under colour of religion, the people were debarred from such sports and recreations as contributed to their health as well as amusement. Imagining, therefore, that it would be easy to infuse cheerfulness into the dark spirit of devotion which then prevailed, he issued a proclamation to allow and encourage, after divine service, all kinds of lawful games and exercises; and this proclamation his subjects regarded as the utmost instance of profaneness and impiety. In 1620 a bill was brought in by the commons for the more strict observance of the Sunday, which they affected to call the *Sabbath*. One Shepherd opposed this bill, objected to the appellation of *Sabbath* as puritanical, and seems even to have justified sports on that day. For this he was expelled the house by the suggestion of Mr

Pym; and in the sentence pronounced against Shepherd, his offence is said to be *great, exorbitant, and unparalleled*.

This sketch, we hope, will be sufficient to the reader a tolerable idea of the situation of affairs during the reign of James I. We now proceed to give an account of the few remarkable transactions which occurred in this period.

The first thing of any consequence was a conspiracy formed, the very year of the king's accession to the throne, to displace him, and bestow the kingdom on Arabella Stuart, a near relation of James's, and equally descended from Henry VII. With regard to this conspiracy every thing remains still mysterious, as it was at the time when the conspiracy itself was discovered. What renders it remarkable is the concern Sir Walter Raleigh was said to have in it; for which he was tried, condemned without sufficient proof, suffered 13 years imprisonment in the tower, and was afterwards executed out of complaisance to the Spaniards.

18
Sir Walter
Raleigh's
conspiracy.

* See Ra-
leigh.

In 1605 was discovered the famous *gunpowder treason*, the anniversary of which discovery hath ever afterwards been celebrated with rejoicings. Its origin was as follows. On the accession of James, great expectations had been formed by the catholics that he would prove favourable to them, both as that was the religion of his mother, and that he himself had been suspected of a bias towards it in his youth. It is even pretended that he had entered into positive engagements to grant them a toleration as soon as he should mount the throne of England. Here, however, they found their hopes built on a false foundation. James, on all occasions, expressed his intention of executing strictly the laws enacted against them, and of persevering in all the rigorous measures of Queen Elizabeth. A plan of revenge was first thought of by one Cateley, a gentleman of good parts, and of an ancient family. He communicated his mind to Percy, a descendant of the house of Northumberland. The latter proposed to assassinate the king; but this seemed to Cateley very far from being adequate to their purpose. He told Percy, that the king would be succeeded by his children, who would also inherit his maxims of government. He told him, that, even though the whole royal family were destroyed, the parliament, nobility, and gentry, who were all infected with the same heresy, would raise another Protestant prince to the throne.

"To serve any good purpose (says he), we must destroy, at one blow, the king, the royal family, the lords and commons; and bury all our enemies in one common ruin. Happily they are all assembled on the first meeting of parliament; and afford us the opportunity of glorious and useful vengeance. Great preparations will not be requisite. A few of us may run a mine below the hall, in which they meet; and chusing the very moment when the king harangues both the houses, consign over to destruction those determined foes to all piety and religion. Mean while, we ourselves standing aloof, safe and unsuspected, shall triumph in being the instruments of divine wrath, and shall behold with pleasure those sacrilegious walls, in which were passed the edicts for proscribing our church and butchering her children, tossed into a thousand fragments; while their impious inhabitants, meditating perhaps still new persecutions against us, pass from flames

19
Account of
the gun-
powder trea-
son.

20
Cateley's
speech.

Britain.

Britain.

flames above to flames below, there for ever to endure the torments due to their offences."

This terrible scheme being approved of, it was resolved to communicate it to a few more. One Thomas Winter was sent over to Flanders in quest of Fawkes, an officer in the Spanish service of approved zeal and courage. All the conspirators were bound by the most solemn oaths, accompanied with the sacrament; and to such a degree had superstition effaced every principle of humanity from their minds, that not one of them ever entertained the smallest compunction for the cruel massacre they were going to commit. Some indeed were startled at the thoughts of destroying a number of catholics who must necessarily be present as spectators, or attendants on the king, or as having seats in the house of peers. But Telford a jesuit, and Garnet superior of that order in England, removed those scruples, by shewing that the interest of religion required in this case the sacrifice of the innocent with the guilty.

This happened in the spring and summer of 1604; when the conspirators also hired a house in Percy's name, adjoining to that in which the parliament was to assemble. Towards the end of that year they began to pierce through the wall of the house, in order to get in below that where the parliament was to sit. The wall was three yards thick, and consequently occasioned a great deal of labour. At length, however, they approached the other side, but were then startled by a noise for which they could not well account. Upon inquiry, they found that it came from a vault below the house of lords; that a magazine of coals had been kept there; and that the coals were then felling off, after which the vault would be let to the highest bidder. Upon this the vault was immediately hired by Percy; 36 barrels of powder lodged in it; the whole covered up with faggots and billets; the doors of the cellar boldly flung open; and every body admitted, as if it contained nothing dangerous.

Being now, as they thought, assured of success, the conspirators began to plan the remaining part of their enterprize. The king, the queen, and prince Henry, were expected to be present at the opening of the parliament. The duke, by reason of his tender age, would be absent, and it was resolved that Percy should seize or murder him. The princess Elizabeth, likewise a child, was kept at Lord Harrington's house in Warwickshire; and some others of the conspirators engaged to assemble their friends on pretence of a hunting match, when they were to seize that princess, and immediately proclaim her queen. The day so long wished for at last approached; the dreadful secret, tho' communicated to more than 20 persons, had been religiously kept for near a year and an half; and nothing could be foreseen which could possibly prevent the success of their design. Ten days before the meeting of parliament, however, lord Montague, a catholic son to lord Morley, received the following letter, which had been delivered to his servant by an unknown hand. "My lord, out of the love I bear to some of your friends, I have a care of your preservation. Therefore I would advise you, as you tender your life, to devise some excuse to shift off your attendance on this parliament. For God and man have determined to punish the wickedness of this time. And think not slightly of this advertisement; but retire yourself into the country,

where you may expect the event in safety. For, tho' there be no appearance of any stir, yet, I say, they shall receive a terrible blow this parliament; and yet they shall not see who hurts them. This counsel is not to be condemned, because it may do you good, and can do you no harm: for the danger is over as soon as you have burned this letter. And I hope God will give you the grace to make good use of it, to whose holy protection I commend you."—Though Montague imagined this letter to be only a ridiculous artifice to frighten him, he immediately carried it to lord Salisbury, secretary of state; who laid it before the king on his arrival in town a few days after.

The king looked upon the letter in a more serious light. From the manner in which it was wrote he concluded that some design was forming to blow up the parliament-house with gunpowder, and it was thought advisable to search the vaults below. The lord chamberlain, to whom this charge belonged, purposely delayed the search till the day before the meeting of parliament. He remarked those great piles of wood and faggots which lay in the vault under the upper house; and casting his eye upon Fawkes, who stood in a corner and passed himself for Percy's servant, he took notice of that daring and determined courage which was conspicuous in his face, and so much distinguished this conspirator even amongst the other heroes in villany that were concerned in the scheme. Such a quantity of fuel, also, for one who lived so little in the town as Percy, appeared somewhat extraordinary; and upon comparing all circumstances, it was resolved to make a further search. About midnight, Sir Thomas Knevet, a justice of peace, was sent with proper attendants; and before the door of the vault, finding Fawkes, who had just finished all his preparations, he immediately seized him, and, turning over the faggots, discovered the powder. The matches and every thing proper for setting fire to the train were taken in Fawkes's pocket; who seeing now no refuge but in boldness and despair, expressed the utmost regret that he had lost the opportunity of firing the powder at once, and of sweetening his own death by that of his enemies. For two or three days he displayed the same obdurate intrepidity; but, being confined in the tower, and the rack just shewn to him, his courage at last failed, and he made a full discovery of all the conspirators.

Catesby, Percy, and the other criminals, on hearing that Fawkes was arrested, hurried away to Warwickshire; where Sir Edward Digby, imagining that his confederates had succeeded, was already in arms, to seize the princess Elizabeth. She had escaped into Coventry; and they were obliged to put themselves in a posture of defence against the country-people, who were raised from all quarters and armed by the sheriffs. The conspirators, with all their attendants, never exceeded the number of 80 persons; and being surrounded on every side, could no longer have any hope either of prevailing or escaping. Having therefore confessed themselves, and received absolution, they boldly prepared for death, and resolved to sell their lives as dear as possible. But even this miserable consolation was denied them. Some of their powder took fire, and disabled them from defending themselves. The people then rushed in upon them. Percy and Catesby

22
Conspiracy
discovered.

22
Fawkes
seized.

24
Conspirators
punished.

Britain.

tesby were killed with one shot. Digby, Rookwood, Winter, and others, being taken prisoners, were tried, confessed their guilt, and died, as well as Garnet, by the hands of the common executioner. The lords Stourton and Mordaunt, two catholics, were fined, the former of 4000*l.* the latter of 10,000*l.* by the star-chamber; because their absence from parliament had occasioned a suspicion of their being made acquainted with the conspiracy. The earl of Northumberland was fined 30,000*l.* and detained several years a prisoner in the tower; because, not to mention other grounds of suspicion, he had admitted Percy into the number of gentlemen pensioners, without his taking the requisite oaths.

25
James's wife
conduct in
the legisla-
tion of Ire-
land.

In 1612, James appears in his most advantageous point of view, namely, as legislator of Ireland, and the person who undertook to civilize the barbarous inhabitants of that kingdom, and to render their subjection durable and useful to the crown of England. In this work, James proceeded by a steady, regular, and well-concerted plan. He began with abolishing the ancient Irish customs which supplied the place of laws, and which were exceedingly barbarous and absurd. By the Brehon law, every crime however enormous was punished not with death, but by a fine. Murder itself was compensated in this way. Every one had a value affixed to him, called his *eric*; and whoever was able to pay this, might kill him when he pleased. As for such slight offences as oppression, extortion, or other things of that nature, no penalty was affixed to them, nor could any redress for them ever be obtained. By the custom of *gavelkind*, upon the death of any person, his land was divided among all the males of the sept or family, both bastard and legitimate: and after partition made, if any of the sept died, his portion was not shared out among his sons; but the chieftain at his discretion made a new partition of all the lands belonging to that sept, and gave every one his share: as no man, by reason of this custom, enjoyed the fixed property of any land; to build, cultivate, or improve, must have been so much lost labour. These chieftains were established by election, or, more properly speaking, by force and violence. Their authority was absolute; and, notwithstanding certain lands were assigned to the office, its chief profit resulted from exactions, dues, assessments, for which there was no fixed law, and which were levied at pleasure.

After abolishing these customs, and substituting English law in their place; James having taken all the natives under his protection, and declared them free citizens, proceeded to govern them by a regular administration, military as well as civil. A sufficient army was maintained, its discipline inspected, and its pay transmitted from England, in order to prevent the soldiery from preying upon the country, as had been usual in former reigns. When Odoghartie raised an insurrection, a reinforcement was sent over, and the rebellion immediately extinguished. All minds being first quieted by an universal indemnity, circuits were established, justice administered, and crimes of every kind severely punished. As the Irish had been universally engaged in a rebellion against Elizabeth, a resignation of all the rights formerly granted them to separate jurisdictions was rigorously exacted; a resignation of private estates was even required; and when

they were restored, the proprietors received them under such conditions as might prevent all future tyranny and oppression over the common people. The whole province of Ulster having fallen to the crown by the attainer of rebels, a company was established in London for planting new colonies in that fertile country. The property was divided into moderate shares, the largest not exceeding 2000 acres: Tenants were brought over from England and Scotland: The Irish were removed from the hills and fastnesses, and settled in the open country: Husbandry and the arts were taught them; and by these means Ulster, from being the most wild and disorderly province in Ireland, soon became the best cultivated and most civilized.

This year was also remarkable for the death of Henry prince of Wales, who died suddenly on the 6th of November, not without strong suspicions of poison, for which the king himself was blamed. On opening his body, however, no symptoms of poison appeared; but his death diffused an universal grief throughout the nation, he being reckoned a prince of extraordinary accomplishments.

26
Death of
Henry
prince of
Wales.

The marriage of the princess Elizabeth with Frederic elector palatine, which was celebrated February 14th 1613, served to dissipate the grief which had arisen on account of prince Henry's death. But this marriage, in the event, proved unhappy to the king as well as his son-in-law. The elector, trusting to so great an alliance, engaged in enterprizes beyond his strength; and James, not being able, and indeed perhaps not willing, to assist him in his distresses, lost entirely what remained of the affections of his people.

27
Marriage of the princess
Elizabeth
with the e-
lector pala-
tine.

These had consequences did not begin to appear till the year 1619. At that time the states of Bohemia having taken arms against the emperor Matthias, in defence of the Protestant religion, and continued their revolt against his successor Ferdinand II. and being alarmed at his mighty preparations against them, made an offer of their crown to the elector palatine. To this they were induced by the greatness of his connections, as being son-in-law to the king of England, and nephew to prince Maurice, whose authority in the United Provinces was almost absolute; and the young palatine stimulated by ambition, without consulting either James or Maurice, whose opposition he foresaw, immediately accepted the offer, and marched all his forces into Bohemia, in support of his new subjects.

28
The elector
chosen king
of Bohemia.

The affairs of the new king were not long of coming to an unfortunate crisis. It was known almost at one time in England, that Frederic being defeated in the great and decisive battle of Prague, had fled with his family into Holland; and that Spinola the Spanish general had invaded the palatinate, where meeting with little resistance, except from one body of 2400 Englishmen commanded by the brave Sir Horace Vere, had in a little time reduced almost the whole principality. In 1621, the ban of the empire was published against the unfortunate elector, and the execution of it was committed to the duke of Bavaria. The upper palatinate was in a little time conquered by that prince; and measures were taking in the empire for bestowing on him the electoral dignity of which the palatine was depossessed. Frederic was now obliged to live with his numerous family, in poverty and distress, either in Holland, or at Sedan, with his uncle the

29
Deceased,
and driven
out of his
dominions.

Britain.

the duke of Bouillon; and the new conquests of the catholics throughout all Germany were attended with persecutions against the Protestants.

30
English in-
sult for a war
with the
house of
Austria.

At this news the religious zeal of the English was inflamed to the highest degree; and they would have plunged headlong into a war with the house of Austria, without reflecting in the least on the consequences that might ensue. The sufferings of their Protestant brethren in Germany were the only objects of consideration, and the neutrality and inactive spirit shewn by James were loudly exclaimed against. But though James might have defended his pacific measures by very plausible arguments, it is certain that some of his motives were the most ridiculous that can be imagined.

31
His ridicu-
lous motives
for not af-
fecting his
son-in-law.

Such was the opinion that he himself entertained of his own wisdom, that he imagined himself capable of disarming hostile nations by dint of argument; and that the whole power of Austria, though not awed by the power of England, would submit to his arbitration, merely out of respect to his virtue and moderation.— So much also he was wedded to his opinion concerning the prerogative of kings, that he imagined, wherever there was a contention between any sovereign and his subjects, the latter behaved always to be in the wrong; and for this reason, from the very first he had denied his son-in-law the title of *king of Bohemia*, and forbade him to be prayed for in the churches under that appellation.

32
He is defen-
sive of a
Spanish
match for
his son.

Besides these reasons, James was on another account extremely averse to come to a rupture with Spain. He had entertained an opinion peculiar to himself, which was, that any alliance below that of a king was unworthy a prince of Wales; and he never would allow any prince but a daughter of France or Spain to be mentioned as a match for his son. This piece of pride, which really implied meanness, as if he could have received honour from any alliance, gave Spain an opportunity of managing this monarch in his most important concerns. With a view to engage him to a neutrality with regard to the succession of Cleves, the eldest daughter of the king of Spain had been indirectly offered during the life of prince Henry. The bait, however, did not then take; James, in consequence of his alliance with the Dutch, marched 4000 men to the assistance of the Protestants, by which means the succession was secured to the Protestant line. In 1618, Gondomar the Spanish ambassador made offer of the king's second daughter to prince Charles; and, that he might render the temptation irresistible to the necessitous James, gave hopes of an immense fortune that should attend the prince. Upon this match James had built great hopes, not only of relieving his own necessities, but of recovering the palatinate for his son-in-law; which last, he imagined, might be procured from the mere motive of friendship and personal attachment.

33
Commons
averse to
this mea-
sure.

This last step was equally disagreeable to the commons with the rest; and, joined to the other pieces of James's conduct, at last blew into a flame the contention which had so long subsisted between their sovereign and them. On the 14th of November 1621, the commons framed a remonstrance which they intended to carry to the king. They represented, that the enormous growth of the Austrian power threatened the liberties of Europe; that the progress of the Catholic religion in England bred the most melancholy appre-

34
They frame
a remon-
strance a-
gainst it.

hensions lest it should again acquire an ascendancy in the kingdom; that the indulgence of his majesty towards the professors of that religion had encouraged their insolence and temerity; that the uncontrolled conquests made by the Austrian family in Germany raised mighty expectations in the English Papists; but above all, that the Spanish match elevated them so far as to hope for an entire toleration, if not a final re-establishment, of their religion. They therefore intreated his majesty, that he would immediately undertake the defence of the palatine, and maintain it by force of arms; that he would turn his sword against Spain, whose armies and treasures were the chief support of the Catholic interest in Europe; that he would enter into no negotiation for the marriage of his son but with a Protestant prince; that the children of Popish recusants should be taken from their parents, and committed to the care of Protestant teachers and school-masters; and that the fines and confiscations to which the Catholics by law were liable, should be levied with the utmost severity.

The king, who was then at Newmarket, hearing of the intended remonstrance, wrote a letter to the speaker, in which he sharply rebuked the house for debating on matters far above their reach and capacity; and he strictly forbade them to meddle with any thing that regarded his government, or deep matters of state, and especially not to touch on his son's marriage with the Spanish prince. Upon this the commons framed a new remonstrance, in which they asserted their right of debating on all matters of government, and that they possessed entire freedom of speech in their debates. The king replied, that their remonstrance was more like a denunciation of war, than an address of dutiful subjects; that their pretension to inquire into all state affairs without exception, was such a plenipotency as none of their ancestors, even during the reign of the weakest princes, had ever pretended to; that public transactions depended on a complication of views and intelligence, with which they were entirely unacquainted; that they could not better shew their wisdom, as well as duty, than by keeping within their proper sphere; and that in any business which depended on his prerogative, they had no title to interpose with their advice, unless when he pleased to ask it, &c. The commons in return framed the protestation already mentioned, which the king tore out of their journals, and soon after dissolved the parliament. The leading members of the house, Sir Edward Coke and Sir Robert Phillips, were committed to the tower; three others, Selden, Pym, and Mallory, to other prisons; and, as a lighter punishment, some others were sent into Ireland to execute the king's business. Sir John Saville, however, a powerful man in the house of commons, and a zealous opposer of the court, was made controller of the household, a privy counsellor, and soon after a baron. This event is memorable; as being the first instance in the English history, of any king's advancing a man on account of parliamentary interest, and of opposition to his measures.

This breach between the king and parliament soon made politics become a general subject of discourse, and every man began to indulge himself in reasonings and inquiries concerning matters of state; and the factions which commenced in parliament were propagated through-

Britain.

35
Contention
between the
king and
commons.

36
Origin of
the factions
of whig and
tory.

Britain.

throughout the nation. In vain did James by reiterated proclamations forbid discourses of this kind. Such proclamations, if they had any effect, served rather to inflame the curiosity of the public. In every company or society the late transactions became the subject of argument and debate; some taking the side of monarchy, others of liberty; and this was the origin of the two parties since known by the names of *Whigs* and *Tories*.

37
James gains
the favour
of the court
of Spain.

For five years, James continued the dupe of the court of Spain. Though firmly resolved to contract no alliance with a heretic, the king of Spain had continued to procrastinate, and invent one excuse after another, while he pretended to be very willing to conclude the match. At last the king of England, finding out what was really the matter, resolved to remove that obstacle if possible. He issued public orders for discharging all Popish recusants who were imprisoned; and it was daily apprehended that he would forbid, for the future, the execution of the penal laws against them. For this conduct he was obliged to apologize, and even pretend that it was done in order to procure from foreign princes a toleration for the Protestants; the severity of the English laws against catholics, he said, having been urged as a reason against shewing any favour to Protestants residing in catholic kingdoms.

These concessions in favour of the catholics, however ill relished by his subjects, at last obtained James's end with regard to the marriage. The earl of Bristol, ambassador at the court of Spain, a minister of vigilance and penetration, and who had formerly opposed the alliance with catholics, being now fully convinced of the Spanish sincerity, was ready to congratulate the king on the completion of his projects. The Spanish princefs is represented as very accomplished; she was to bring with her a fortune of 600,000*l.*; and, what was more, not only Bristol considered this match as an infallible prognostic of the palatine's restoration, but the Spaniards themselves did the same. All things being therefore agreed upon between the parties, nothing was wanting but the dispensation from Rome, which might be considered as a matter of mere formality. The king exulted in his pacific counsels, and boasted of his superior sagacity and penetration; when all his flattering prospects were blasted by the temerity of the duke of Buckingham, who governed both court and nation with almost unlimited sway.

This nobleman had suddenly been raised to the highest honours. Though possessed of some accomplishments of a courtier, he was utterly devoid of every talent of a minister; but at once partook of the insolence which attends a fortune newly acquired, and the impetuosity which belongs to persons born in high stations, and unacquainted with opposition. Among those who had experienced the arrogance of this overgrown favourite, the prince of Wales himself had not been entirely spared; and a great coldness, if not enmity, had for that reason taken place between them. Buckingham, being desirous of putting an end to this coldness, and at the same time envious of the great reputation of the earl of Bristol, persuaded the prince to undertake a journey to Madrid; which, he said, would be an unexpected gallantry; would equal all the fictions of Spanish romance; and, suiting the amorous and enterprising character of that nation, must immediately introduce him to the princefs under the agreeable character of a devoted lo-

39
Prince
Charles and
Buckingham re-
solved to
go on a journey
into Spain.

ver and daring adventurer. Little persuasion was necessary to prevail with prince Charles to undertake this journey; and the impetuosity of Buckingham having extorted a consent from James, our two adventurers set out, prince Charles as the knight-errant, and Buckingham as the squire. They travelled through France in disguise, assuming the names of Jack and Tom Smith. They went to a ball at Paris, where the prince first saw the princefs Henrietta whom he afterwards married, who was then in the bloom of youth and beauty, and with whom the novellists of that time say he then fell in love. On their arrival at Madrid, every body was surprised by a step so little usual among great princes. The Spanish monarch made Charles a visit, expressed the utmost gratitude for the confidence he reposed in him, and made warm protestations of a correspondent confidence and friendship. He gave him a golden key which opened all his apartments, that the prince might, without any introduction, have access to him at all hours: he took the left hand of him on every occasion, except in the apartments assigned to Charles; for there, he said, the prince was at home: Charles was introduced into the palace with the same pomp and ceremony which attend the kings of Spain on their coronation: the council received public orders to obey him as the king himself: Olivarez too, the prime minister, though a grandee of Spain, who has the right of being covered before his own king, would not put on his hat in the prince's presence: all the prisons of Spain were thrown open, and all the prisoners received their freedom, as if an event the most honourable and most fortunate had happened to the monarchy; and every sumptuary law with regard to apparel was suspended during prince Charles's residence in Spain. The infant, however, was only shown to her lover in public; the Spanish ideas of decency being so strict, as not to allow any farther intercourse till the arrival of the dispensation. The point of honour was carried so far by these generous people, that no attempt was made, on account of the advantage they had acquired by having the prince of Wales in their power, to impose any harder conditions of treaty: their pious zeal only prompted them on one occasion to desire more concessions in the religious articles; but, on the opposition of Bristol, they immediately desisted. The Pope, however, hearing of Charles's arrival in Madrid, tacked some new clauses to the dispensation; and it became necessary to transmit the articles to London, that the king might ratify them. This treaty, which was made public, consisted of several articles, chiefly regarding the exercise of the catholic religion by the infant; and, among these, nothing could reasonably be found fault with, except one article, in which the king promised that the children should be educated by the princefs till they were ten years of age; which undoubtedly was insisted upon with a view of seasoning their minds with catholic principles. But, besides this public treaty, there were some private articles sworn to by James, which could not have been made public without grievous murmurs. A suspension of the penal laws against the English catholics was promised, as likewise a repeal of them in parliament, and a toleration for the exercise of that religion in private houses. Meanwhile Gregory XV. who granted the dispensation, died; and Urban VIII. was chosen in his place. Upon this event, the nuncio refused to deliver the dispensation

Britain.

40
Their kind
reception in
that king-
dom.

41
Articles of
the mar-
riage treaty.

Britain.

42
The prince
returns.

faction till it should be renewed by Urban. This crafty pontiff delayed, in hopes that, during the prince's residence in Spain, some expedient might be fallen upon to effect his conversion. The king of England, as well as the prince, became impatient: but, on the first hint, Charles obtained leave to return; and Philip graced his departure with all the circumstances of civility and respect which had attended his arrival. He even erected a pillar on the spot where they took leave of each other, as a monument of mutual friendship; and the prince, having sworn to the observance of all the articles, embarked on board the English fleet at St Andro.

43
Buckingham pre-
vails on him
to resolve a-
gainst the
marriage.

The modest, reserved, and decent behaviour of Charles, together with his unparalleled confidence in them, and the romantic gallantry he had practised with regard to their princefs, had endeared him to the whole court of Madrid. But in the same proportion that Charles was beloved and esteemed, was Buckingham despised and hated. His fallies of passion; his indecent freedoms with the prince; his dissolute pleasures; his arrogant impetuous temper, which he neither could nor would disguise; were to the Spaniards the objects of peculiar aversion. They lamented the infant's fate, who must be approached by a man whose temerity seemed to respect no laws divine or human. Buckingham, on the other hand, sensible how odious he was become to the Spaniards, and dreading the influence which that nation would naturally acquire after the arrival of the infant, resolved to employ all his credit in order to prevent the marriage. By what arguments he could prevail on the prince to offer such an insult to the Spanish nation, from whom he had received such generous treatment; by what colours he could disguise the ingratitude and imprudence of such a measure; these are totally unknown to us: certain it is, however, that when the prince left Madrid, he was firmly determined, in opposition to his most solemn promises, to break off the treaty with Spain. On their arrival at London, therefore, the prince and Buckingham assumed the entire direction of the negotiation; and it was their business to seek for pretences by which they could give a colour to their intended breach of treaty. At last, after many fruitless artifices were employed to delay or prevent the espousals, Bristol received positive orders not to deliver the proxy which had been left in his hands, or to finish the marriage, till security was given for the full restitution of the palatinate. Philip undertook this language: but being determined to throw the whole blame of the rupture on the English, he delivered into Bristol's hand a written promise, by which he bound himself to procure the restoration of the palatinate either by persuasion or by every other possible means; and when he found that this concession gave no satisfaction, he ordered the infant to lay aside the title of *princess of Wales*, which she bore after the arrival of the dispensation from Rome, and to drop the study of the English language; and as he knew that such rash counsels as now governed the court of England would not stop at the breach of the marriage-treaty, he immediately ordered preparations for war to be made throughout all his dominions.

44
Philip ob-
liges himself
to procure
the restitu-
tion of the
palatinate.

A match for prince Charles was soon after negotiated with Henrietta, daughter of the great Henry IV. and this met with much better success than the

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former. However, the king had not the same allurements in prosecuting this match as the former, the portion promised him being much smaller; but, willing that his son should not be altogether disappointed of a bride, as the king of France demanded only the same terms that had been offered to the court of Spain, James thought proper to comply. In an article of this treaty of marriage, it was stipulated, that the education of the children till the age of 13 should belong to the mother; and this probably gave that turn towards popery which has since proved the ruin of the unfortunate family of Stewart.

Britain.

James now, being deprived of every other hope of relieving his son-in-law but by force of arms, declared war against Spain and the emperor, for the recovery of the palatinate; 6000 men were sent over into Holland to assist prince Maurice in his schemes against those powers; the people were every where elated at the courage of their king, and were satisfied with any war which was to exterminate the Papists. This army was followed by another consisting of 12,000 men, commanded by count Mansfeldt; and the court of France promised its assistance. But the English were disappointed in all their views: the troops being embarked at Dover, upon failing to Calais, found no orders for their admission. After waiting for some time, they were obliged to sail towards Zealand, where no proper measures were yet consulted for their disembarkation. Mean while, a pestilential distemper crept in among them, so long cooped up in narrow vessels: half the army died while on board; and the other half, weakened by sickness, appeared too small a body to march into the palatinate; and thus ended this ill-concerted and fruitless expedition. Whether this misfortune had any effect on the king's constitution or not, is uncertain; but he was soon after seized with a tertian ague, which put an end to his life on the 27th of March 1625, after having lived 59 years, and reigned over England 22, and over Scotland almost as long as he had lived.

46
War decla-
red against
Spain.47
Unsuccess-
ful expedi-
tion of count
Mansfeldt.48
Death of
king James.

James was succeeded by his son Charles I. who ascended the throne amidst the highest praises and caresses of his subjects for what was perhaps the most blame-worthy action of his life, namely, his breaking off the match with the Spanish princefs, and procuring the rupture with the house of Austria. Being young and inexperienced, he regarded these praises as sincere; and therefore was so impatient to assemble the great council of the nation, that he would gladly, for the sake of dispatch, have called together the same parliament which sat under his father, and which lay at that time under prorogation. But being told that such a measure would appear unusual, he issued writs for summoning a new parliament on the 7th of May; and it was not without regret that the arrival of the princefs Henrietta, whom he had espoused by proxy, obliged him to delay, by repeated prorogations, their meeting till the 18th of June, when they assembled at Westminster for the dispatch of business.

49
Succeeded
by his son
Charles I.50
His affection
for his pro-
ple.

Charles inherited from his father, great distrests for money, very high notions of the royal prerogative, and a violent attachment to episcopacy. As to his character, he seems to have been obstinate, though not resolute; and therefore, though it was scarce ever possible to make him give up his point, he never could carry on his designs with that spirit which was necessary for

51
His charac-
ter.

Britain.

Britain.

52
His first
speech to his
parliament.

their success. In other respects, he appears to have possessed every virtue requisite to constitute the character of a good man. At present believing his subjects to be in perfect friendship with him as he was with them, he resolved that their bounty to him should be entirely unasked, and the genuine effect of mutual confidence and regard. Accordingly, his discourse to the parliament was full of simplicity and cordiality; he lightly mentioned the occasion he had for supply. He employed no intrigue to influence the suffrages of the members. He would not even allow the officers of the crown, who had seats in the house, to mention any particular sum which he had occasion for; but trusted entirely to the wisdom and affection of his parliament, who perfectly well knew his circumstances.

53
Their scandalous
proceedings.

It is almost impossible to read without indignation an account of the return made by the commons to this generous behaviour of their sovereign. They knew, that all the money granted by the last parliament had been expended on military and naval preparations; and that great anticipations were likewise made on the revenues of the crown. They were not ignorant that Charles was loaded with a debt contracted by his father, who had borrowed money both from foreign princes, and from his own subjects. They had learned by experience, that the public revenues could with difficulty maintain the dignity of the crown, even under the ordinary charges of government. They were sensible that the present war was, very lately, the result of their own importunate applications and intreaties, and that they had solemnly engaged to support their sovereign in the management of it. They were acquainted with the difficulty of military enterprises directed against the whole house of Austria; against the king of Spain, possessed of the greatest riches and most extensive dominions of any prince in Europe; against the emperor Ferdinand, hitherto the most fortunate monarch of the age, who had subdued and astonished Germany by the rapidity of his victories. Deep impressions they saw must be made by the British sword, and a vigorous offensive war be waged against these mighty potentates, ere they would resign the palatinate which they had now fully subdued, and which they held in secure possession by its being surrounded with all their other territories. To answer, therefore, all these great and important ends; to satisfy their young king in the first request he made them; to prove their sense of the many royal virtues, particularly economy, with which Charles was endued; the commons thought proper to confer on the king a supply of 112,000 *l*. To search for the reasons of such an extravagant piece of conduct would be needless; it is impossible they could be good.

It is not to be supposed that Charles, or any person of common sense, could be insensible of such treatment as this; he behaved, however, with great moderation. He represented in the most explicit manner the necessity there was for a large supply: he even condescended to use intreaties: he said that this request was the first he had ever made them; that he was young, and in the commencement of his reign; and if he now met with kind and dutiful usage, it would endear him to the use of parliaments, and would forever preserve an entire harmony between him and his people.—To these reasons and intreaties, the commons remained inexorable; they

even refused the addition of two fifteenths to the former supply. Instead of this, they renewed their ridiculous complaints against the growth of popery, which was now their only grievance. They shewed their intolerant spirit by demanding a strict execution of the penal laws against the catholics; and remonstrated against some late pardons granted to priests. They attacked Montague, one of the king's chaplains, on account of a moderate book which he had lately composed, and which, to their great disgust, saved virtuous catholics as well as other Christians from eternal torments. Charles gave them a gracious and compliant answer; but firmly resolved to abate somewhat of the rigorous laws against that unfortunate party, which his engagements with France absolutely required. No measure, however, throughout the whole reign of this prince, was more disgusting to his bigoted subjects, or by its consequences more fatal to himself, than this resolution. The Puritans had continued to gain ground during the whole reign of James, and now formed the majority of the house of commons; in consequence of which, petitions were presented to the king for replacing such *able* clergymen as had been silenced for want of conformity to the ceremonies. They also enacted laws for the strict observance of Sunday, which they affected to call the *sabbath*, and which they sanctified with the most melancholy indolence; and it is worthy of notice, that the different appellations of *Sunday* and *sabbath* were at that time known symbols of the different parties.—In consequence of this behaviour in Charles's first parliament, it was dissolved on the 12th of August 1625, and a new one called on Feb. 6th 1626.

During this interval Charles had been obliged to borrow from his subjects on privy-seals; the advantage of which was but a small compensation for the disgust it occasioned. By means, however, of that supply, and some other expedients, he was enabled to equip his fleet, tho' with difficulty. It was designed against Spain, but performed nothing worth notice, and its bad success increased the clamours against the court.

Charles's second parliament immediately adopted the same views with the former; however, they voted him a supply of three subsidies (168,000 *l*.) and three fifteenths; but the passing this vote into a law was reserved until the end of the session, that in the mean time they might have an opportunity of forcing the king to make what concessions they pleased. This harsh and undutiful conduct was greatly resented by Charles; but he found himself obliged to submit, and wait the event with patience. In the mean time they attacked the duke of Buckingham, who was become generally obnoxious; and he was also impeached by the earl of Bristol, on account of his conduct with regard to the Spanish negotiation. The earl's impeachment, however, was entirely overlooked, and the commons were able to prove nothing otherwise of any consequence against him. The king imagining that Buckingham's greatest crime was the having been so much in favour with his sovereign, commanded the house expressly not to meddle with his minister and servant, but to finish in a few days the bill they had begun for the subsidies; otherwise they must expect to sit no longer.

Suggestions of this kind had a bad effect; and when the king proceeded further to throw into prison two members

54
King's resolution to favour the Catholics.

55
Parliament dissolved.

56
His scheme to raise money.

57
Proceedings of his second parliament.

58
The commons dissolved.

Britain.

members of the house who had managed the impeachment against Buckingham, the commons declared that they would proceed no further in business till they had satisfaction in their privileges. Charles alleged as the reason of this measure, certain seditious expressions, which, he said, had, in their accusation of the duke, dropped from these members. Upon inquiry it appeared that no such expressions had been used, and the members were accordingly released. Soon after, the house of lords, moved by the example of the commons, claimed liberty for the earl of Arundel, who had been lately confined in the tower; and after many fruitless evasions the king was obliged, though somewhat ungraciously, to comply.

The next attack made by the commons would have proved decisive, had it succeeded, and would have reduced the king to an absolute dependence on his parliament. They were preparing a remonstrance against the levying of tonnage and poundage without consent of parliament. This article, together with the new impositions laid on merchandise by James, constituted near one half of the crown revenues; and after having gained this point, they were to petition the king, which then would have been the same thing with commanding him, to remove Buckingham from his presence and councils. The king, however, being alarmed at the yoke they were preparing for him, dissolved his parliament a second time, June 15th 1626.

Charles having thus made such a breach with his parliament as there was no hopes of repairing, was obliged to have recourse to the exercise of every branch of his prerogative in order to supply himself with money. A commission was openly granted to compound with the catholics, and agree for dispensing with the penal laws enacted against them; and by this expedient the king, indeed, filled his coffers, but gave universal disgust to his subjects. From the nobility he desired assistance: from the city he required a loan of 100,000 l. The former contributed slowly: but the latter, covering themselves under many pretences and excuses, gave at

last a flat denial. In order to equip a fleet, a distribution by order of the council was made to all the maritime towns; and each of them was required, with the assistance of the adjacent counties, to arm as many vessels as were appointed them. The city of London was rated at 20 ships: and this is the first appearance, in Charles's reign, of ship-money; a taxation which had once been imposed by Elizabeth, but which, when carried some steps farther by Charles, produced the most violent discontents.—These methods of supply were carried on with some moderation, till news arrived of the king of Denmark being totally defeated by count Tilly the Imperial general; but money then becoming more than ever necessary, it was suggested in council, that the most speedy, equal, and convenient method of supply was by a general loan from the subject, according as every man was assessed in the rolls of the last subsidy. That precise sum was required which each would have paid, had the vote of four subsidies been passed into a law: care, however, was taken, that the sums thus exacted were not to be called subsidies, but loans; but it was impossible to avoid observing, that thus the liberty of the subject was entirely destroyed, and all parliaments rendered at once superfluous.

Many people throughout England refused these

loans, and some were even active in encouraging their neighbours to insist upon their common rights and privileges. By warrant of the council, these were thrown into prison. Most of them patiently submitted to confinement, or applied by petition to the king, who commonly released them. Five gentlemen, however, Sir Thomas Darnel, Sir John Corbet, Sir Walter Earl, Sir John Heweningham, and Sir Edmund Hamden, demanded release, not as a favour from the court, but as their due by the laws of their country. No particular cause was assigned for their commitment. The special command of the king and council alone was pleaded. And it was alleged, that by law this was not sufficient reason for refusing bail or release to the prisoners. The question was brought to a solemn trial before the court of king's bench; and the whole kingdom was attentive to the issue of the cause. By the debates on this subject it appeared, that personal liberty had been secured by no less than six different statutes, and by an article in magna charta itself. It appeared, that, in times of turbulence and sedition, the princes infringed upon these laws; and of this also many examples were produced. The difficulty then lay to determine when such violent measures were necessary; but of that the court pretended to be the supreme judge. As it was legal, therefore, that these five gentlemen should plead the statute, by which they might demand bail, so it was expedient in the court to remand them to prison, without determining on the necessity of taking bail for the present. This was a cruel evasion of justice; and, in fact, satisfied neither party. The court insisted that no bail could be taken; the country exclaimed that the prisoners ought to be set free.

While the king was thus embroiled with his parliament at home, and with powerful nations abroad, he rashly engaged in a war with France, a kingdom with which he had but lately formed the most natural alliance. All historians agree that this war proceeded from the rivalry of the duke of Buckingham and cardinal Richlieu; both of whom were in love with the queen of France; and an inveterate enmity being thus produced between these favourites, they resolved to involve their respective nations in the dispute. However this be, war was declared against France; and Charles was taught to hope, that hostilities with that kingdom would be the surest means of procuring tranquillity at home.—The success of this war was proportionable to the wisdom with which it was commenced. Buckingham was appointed commander; and he being entirely unacquainted both with sea and land service, managed matters so ill, that he lost two thirds of his army, and returned in total discredit both as an admiral and general.

The discontents in England now rose to such an height, that there was reason to apprehend an insurrection or rebellion. Charles was also reduced to the greatest distress for want of money. That which he had levied by virtue of his prerogative came in very slowly, and it was dangerous to renew the experiment on account of the ill humour of the nation in general. A third parliament therefore was called March 17th 1628; whom Charles plainly told at the beginning of the session, that “if they should not do their duties, in contributing to the necessities of the state, he must, in discharge of his conscience, use those other means which

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62

Five gentlemen resolve to stand trial.

59
Parliament dissolved.

60
Ship-money

61
A general loan required.

63
War declared against France.

64
Bad success of Buckingham.

65
A third parliament called.

Britain.

God had put into his hands, in order to save that which the follies of some particular men may otherwise put in danger." This parliament behaved in a much more reasonable manner than either of the two former ones. The nation was now really aggrieved by the late arbitrary proceedings. They began with voting against arbitrary imprisonments and forced loans; after which, five subsidies (280,000*l.*) were voted to the king. With this sum, though much inferior to his wants, Charles declared himself well satisfied; and even tears of affection started in his eye when informed of this concession: the commons, however, resolved not to pass this vote into a law, before they had obtained from the king a sufficient security that their liberties should be no longer violated as they had formerly been. They resolved to frame a law, which they were to call a *petition of right*, in which they should collect all the arbitrary exertions of the prerogative which Charles had exposed to their view, and these they were to assault at once by their petition. The grievances now complained of were, forced loans, benevolences, taxes without consent of parliament, arbitrary imprisonments, billeting soldiers, and martial law. They pretended not, as they affirmed, to any unusual powers or privileges; nor did they intend to infringe the royal prerogative in any respect: they aimed only at securing those rights and privileges derived from their ancestors.

66
Petition of
right framed.

67
Dupliety of
the king.

The king, on his part, now began plainly to show that he aimed at nothing less than absolute power. This reasonable petition he did his utmost to evade, by repeated messages to the house, in which he always offered his royal word that there should be no more infringements on the liberty of the subject. These messages, however, had no effect on the commons: they knew how insufficient such promises were, without further security; and therefore the petition at last passed both houses, and nothing was wanting but the royal assent to give it the force of a law. The king accordingly came to the house of peers, sent for the commons, and being seated in the chair of state, the petition was read to him. In answer to it, he said, "The king willeth, that right be done according to the laws and customs of the realm, and that the statutes be put into execution; that his subjects may have no cause to complain of any wrong or oppression contrary to their just rights and liberties, to the preservation whereof he holds himself in conscience as much obliged as of his own prerogative."

This equivocal answer was highly resented. The commons returned in very ill humour. Their indignation would undoubtedly have fallen on the unfortunate catholics, had not their petition against them already received a satisfactory answer. To give vent to their present wrath, therefore, they fell on Dr Manwaring, who had preached a sermon, and, at the special command of the king, printed it; which was now found to contain doctrines subversive of all civil liberty. It taught, that tho' property was commonly lodged in the subject, yet, whenever any exigency required supply, all property was transferred to the sovereign; that the consent of parliament was not necessary for the imposition of taxes; and that the divine laws required compliance with every demand, however irregular, which the prince should make upon his subjects. For these doctrines Manwaring was sentenced to be imprisoned during the plea-

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sure of the house; to be fined 1000*l.* to the king; make submission and acknowledgment for his offence; be suspended three years; be incapable of holding any ecclesiastical dignity or secular office; and that his book be called in and burnt. No sooner, however, was the session ended, than Manwaring received a pardon, and was promoted to a living of considerable value. Some years afterwards he was promoted to the see of St Asaph. At last, the king, seeing it was impossible to carry his point, yielded to the importunities of parliament. He came to the house of peers, and pronouncing the usual form of words, "Let it be law as is desired," gave full sanction and authority to the petition. The house resounded with acclamations, and the bill for five subsidies immediately passed.

68
He at last
gives his assent to the
petition.

The commons, however, were not yet satisfied; they began again to attack Buckingham, against whom they were implacable: they also asserted, that the levying of tonnage and poundage without consent of parliament was a palpable violation of the ancient liberties of the people, and an open infringement of the petition of right so lately granted. The king, in order to prevent a remonstrance on that subject, suddenly prorogued the parliament, on June 26th, 1628.

69
Parliament
prorogued.

The commons soon got rid of their enemy Buckingham; who was murdered, on the 23^d of August this same year, by one Felton who had formerly served under him as a lieutenant. The king did not appear much concerned at his death, but retained an affection for his family throughout his whole lifetime. He desired also that Felton might be tortured, in order to extort from him a discovery of his accomplices; but the judges declared, that though that practice had been formerly very common, it was altogether illegal.

70
Buckingham
murdered.

In 1629, the usual contentions between the king and his parliament continued. The great article on which the commons broke with their sovereign, and which finally created in him a disgust at all parliaments, was their claims with regard to tonnage and poundage. The dispute was, whether this tax could be levied without consent of parliament or not. Charles, supported by multitudes of precedents, maintained that it might; and the parliament, in consequence of their petition of right, asserted that it could not. The commons were resolved to support their rights; and the disputes concerning tonnage and poundage went hand in hand with some theological controversies; particularly concerning Arminianism, which the Puritans, which now formed the majority of the nation, opposed with the greatest violence; and which consequently crept in among those who professed episcopacy, where it hath still maintained its ground more than in any other party.

71
Contentions
about ton-
nage and
poundage.

The commons began with summoning before them the officers of the custom-house, to give an account by what authority they had seized the goods of those merchants who had refused to pay the duties of tonnage and poundage. The barons of exchequer were questioned with regard to their decrees on that head. The sheriff of London was committed to the Tower for his activity in supporting the officers of the custom-house. The goods of Rolles, a merchant, and member of the house, being seized for his refusal to pay the duties, complaints were made of this violence, as if it were a breach of privilege. Charles, on the other hand, supported his officers in all these measures, and the quar-

rel

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rel between him and the commons became every day higher. Sir John Elliot framed a remonstrance against tonnage and poundage, which he offered to the clerk to read; but it was refused, and he then read it himself. The question being called for, Sir John Finch the speaker said, that he had a command from the king to adjourn, and to put no question; upon which he rose and left the chair. The whole house was in an uproar; the speaker was pushed back into the chair, and forcibly held in it, till a short remonstrance was formed, which was instantaneously passed by almost universal acclamation. Papists and Arminians were now declared capital enemies to the commonwealth. Those who levied tonnage and poundage were branded with the same epithet. And even the merchants, who should voluntarily pay those duties, were declared betrayers of English liberty, and public enemies. The doors being locked, the gentleman-usher of the house of lords, who was sent by the king, could get no admittance till this remonstrance was finished. By the king's order he took the mace from the table, which put an end to their proceedings, and on the 10th of March the parliament was dissolved. Some of the members were imprisoned and fined; but this severity served only to increase the general discontent, and point out the sufferers as proper leaders for the popular party.

72
Parliament
dissolved.

Charles being now disgusted with parliaments, resolved to call no more; but finding himself destitute of resources, was obliged to make peace with the two powers with which he was at war. A treaty was signed with France on the 14th of April, and another with Spain on the 5th of November 1630, by which Charles bound himself to observe a neutrality with regard to the affairs on the continent. His conduct to his subjects cannot now appear entirely blameless, nor the general discontent altogether without foundation. As if, however, he had resolved to ruin himself, and to lose the small degree of affection which remained among his subjects, Charles now began to set about making innovations in religion. Archbishop Laud had obtained a prodigious ascendancy over the king; and, by his superstitious attachment to foolish ceremonies, led him into a conduct that proved fatal to himself and to the kingdom in general. The humour of the nation ran at that time in a channel perfectly the reverse of superstition. The ancient ceremonies which had been sanctified by the permission and practice of the first reformers, could scarce be retained in divine service. Laud chose this time, of all others the most improper, for renewing the ceremonies of the fourth and fifth century, when the Christian church, as is well known, was sunk into those superstitions, which were afterwards continued and augmented by the policy of the church of Rome. So openly were these tenets espoused, that not only the discontented Puritans believed the church of England to be relapsing fast into the Romish superstition, but the court of Rome itself entertained hopes of regaining its authority in this island. To forward Laud's good intentions, an offer was twice made him, in private, of a cardinal's hat; which he declined accepting. His answer was, (as he says himself), that "something dwelt within him, which would not suffer his compliance, till Rome was other than it is." It must be confessed, however, that though Laud deserved not the appellation of a *Papist*, the genius of his religion was, though

73
Peace with
France and
Spain.

74
The king
attempts to
introduce
new religious
ceremonies.

in a less degree, the same with that of the Romish. The same profound respect was exacted to the sacerdotal character; the same submission to the creeds and decrees of synods and councils required; the same pomp and ceremony was affected in worship; and the same superstitious regard to days, postures, meats, and vestments. Orders were given, and rigorously insisted on, that the communion-table should be removed from the middle of the area where it had hitherto stood in all churches except cathedrals. It was placed at the east end, railed in, and denominated an *altar*; as the clergyman, who officiated, commonly received the appellation of *priest*. All kinds of ornaments, especially pictures, were introduced. Some of these, upon inquiry, were found to be the very same that were to be met with in the mass-book. The crucifix too, that perpetual consolation of all pious Catholics, and terror to all sound Protestants, was not forgot on this occasion.

In return for Charles's indulgence towards the church, Laud and his followers took care to magnify on every occasion the regal authority, and to treat with the utmost disdain or detestation all puritanical pretensions to a free and independent constitution. From this subjection, however, they took care to exclude themselves, and insisted upon a divine and apostolical charter in preference to a legal and parliamentary one. The sacerdotal character was magnified as sacred and indefeasible; all right to spiritual authority, or even to private judgment in spiritual subjects, was refused to profane laymen: ecclesiastical courts were held by bishops in their own name, without any notice taken of the king's authority: and Charles, tho' extremely jealous of every claim in popular assemblies, seemed rather to encourage than repress those encroachments of his clergy.

The principles which exalted prerogative were put in practice during the whole time that Charles ruled without parliaments. He wanted money for the support of government; and he levied it, either by the revival of obsolete laws, or by violations of the privileges. Though humane and gentle in his nature, he gave way to feverities in the star-chamber and high commission, which seemed necessary in order to support the present mode of administration, and suppress the rising spirit of liberty throughout the kingdom. Tonnage and poundage were continued to be levied by royal authority alone. The former arbitrary impositions were still exacted; and even new impositions laid upon different kinds of merchandize. The custom-house officers received orders from the council to enter into any house, warehouse, or cellar; to search any trunk or chest; and to break any bulk whatever, in default of the payment of customs. In order to exercise the militia, each county by an edict of the council was assessed in a certain fund for maintaining a miller-master appointed for that service. Compulsions were openly made with recusants, and the Popish religion became a regular part of the revenue. A commission was granted for compounding with such as were possessed of crown-lands on defective titles; and on this pretence some money was exacted of the people, &c.

75
His arbitrary
and un-
popular go-
vernment.

While the English were in the utmost discontent, He attempts and almost ready to break out in open rebellion by these arbitrary proceedings, Charles thought proper to attempt setting up episcopacy in Scotland. The canons for establishing ecclesiastical jurisdiction were pro-

76
He attempts
to establish
episcopacy
in Scotland.

Britain.

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promulgated in 1635, and were received without much appearance of opposition; yet, with great inward apprehension and discontent. The first reading of the liturgy was attempted in the cathedral church of St Giles in Edinburgh, in 1637; but this produced such a tumult, that it was not thought safe to repeat the experiment. An universal combination against the religious innovations began immediately to take place; but Charles, as if obstinately bent on his own destruction, continued inflexible in his purpose, though he had nothing to oppose to the united force of the kingdom but a proclamation, in which he pardoned all past offences, and exhorted the people to be more obedient for the future, and to submit peaceably to the use of the liturgy. This proclamation hastened forward the insurrection which had been slowly advancing before. Four tables, as they were called, were formed in Edinburgh. One consisted of nobility, another of gentry, a third of ministers, and the fourth of burgesses. The table of gentry was divided into many subordinate ones, according to their different counties. In the hands of the four tables, the authority of the whole kingdom was placed. Orders were issued by them, and every where obeyed with the utmost regularity; and among the first acts of their government was the production of the COVENANT.

77
Which occasions an insurrection

78
Account of the covenant.

This famous covenant consisted of a renunciation of Popery, formerly signed by James in his youth, and filled with many virulent invectives against that party. A bond of union followed, by which the subscribers obliged themselves to resist all religious innovations, and to defend each other against all opposition whatsoever: And all this for the greater glory of God, and the greater honour and advantage of their king and country. The covenant was subscribed by people of all ranks and conditions. Few disapproved of it in their hearts, and still fewer dared openly to condemn it. The king's ministers and counsellors themselves were mostly of the same way of thinking; and none but rebels to God, and traitors to their country, it was thought, would withdraw themselves from so salutary and pious a combination.

79
Charles attempts to appease the covenanters

The king now began to be alarmed. He sent the marquis of Hamilton, as commissioner, with authority to treat with the covenanters. He required the covenant to be renounced and recalled; and he thought that on his part he made very satisfactory concessions, when he offered to suspend the canons and liturgy till in a fair and legal way they could be received, and so to model the high commission that it should no longer give offence to his subjects. In answer to this demand the covenanters told him, they would sooner renounce their baptism; and invited the commissioner himself to sign it. Hamilton returned to London; made another fruitless journey with new conclusions to Edinburgh; returned again to London, and was immediately sent back with still more satisfactory concessions. The king was now willing to abolish entirely the canons, the liturgy, and the high-commission court; he even resolved to limit extremely the power of the bishops, and was content if on any terms he could retain that order in the church of Scotland. And to ensure all these gracious offers, he gave Hamilton authority to summon first an assembly, and then a parliament, where every national grievance should be redressed.—

These successive concessions only shewed the weakness of the king, and encouraged the malcontents to rise in their demands. The offer, however, of an assembly and a parliament, in which they expected to be entirely masters, was very willingly embraced by the covenanters.

Charles, perceiving what advantage his enemies had reaped from their covenant, resolved to have a covenant also on his side; and he ordered one to be drawn up for that purpose. It consisted of the same violent renunciation of Popery with the other; which, though the king did not approve of it, he thought proper to adopt, in order to remove all the suspicions entertained against him. As the covenanters, in their bond of mutual defence against all opposition, had been careful not to except the king; Charles had formed a bond which was annexed to this renunciation, and which expressed the subscribers loyalty and duty to his majesty. But the covenanters perceiving that this new covenant was only meant to weaken and divide them, received it with the utmost scorn and detestation. And, without delay, they proceeded to model the assembly from which such great achievements were expected.

The assembly met at Glasgow in 1638. A firm determination had been entered into of utterly abolishing episcopacy; and, as a preparative to it, there was laid before the presbytery of Edinburgh, and solemnly read in all the churches of the kingdom, an accusation against the bishops, as guilty, all of them, of heresy, simony, bribery, perjury, cheating, incest, adultery, fornication, common-swearing, drunkenness, gaming, breach of the sabbath, and every other crime which had occurred to the accusers. The bishops sent a protest, declining the authority of the assembly; the commissioner too protested against that court, as illegally constituted and elected; and, in his majesty's name, dissolved it. This measure was foreseen, and little regarded. The court still continued to sit and do business. All the acts of assembly, since the accession of James to the crown of England, were, upon pretty reasonable grounds, declared null and invalid. The acts of parliament which affected ecclesiastical affairs, were on that very account supposed to have no authority. And thus the whole fabric, which James and Charles, in a long course of years, had been rearing with much care and policy, fell at once to the ground. The covenant likewise was ordered to be signed by every one, under pain of excommunication.

In 1639, the covenanters prepared in earnest for war. The earl of Argyre, though he long seemed to temporize, at last embraced the covenant; and he became the chief leader of that party. The earls of Rothes, Cassils, Montrose, Lothian, the lords Lindesay, London, Yester, and Balmerino, also distinguished themselves. Many of their officers had acquired reputation in the German wars, particularly under Gustavus; and these were invited over to assist their country in her present necessity. The command was entrusted to Lesly, a soldier of experience and ability. Forces were regularly enlisted and disciplined. Arms were commissioned and imported from foreign countries. A few castles which belonged to the king, being unprovided of victuals, ammunition, and garrisons, were soon seized. And the whole country, except a small part, where the marquis of Huntly still adhered to the king,

80
Covenant entered into by the royalists.

81
Violent proceedings of the assembly

82
Preparations for war by the covenanters

Britain. king, being in the covenants hands, was soon put into a tolerable posture of defence.

By the king. Charles, on the other hand, was not deficient in his endeavours to oppose this formidable combination. By regular oeconomy he had not only paid all the debts contracted in the French and Spanish wars, but had amassed a sum of 200,000 l.; which it had reserved for any sudden exigency. The queen had great interest with the catholics, both from the sympathy of religion, and from the favours and indulgences which she had been able to procure them. She now employed her credit, and persuaded them, that it was reasonable to give large contributions, as a mark of their duty to the king, during this urgent necessity: And thus, to the great scandal of the Puritans, a considerable supply was gained. The king's fleet was formidable and well supplied. Having put 5000 land-forces on board, he intrusted it to the marquis of Hamilton, who had orders to fail to the frith of Forth, and cause a diversion in the forces of the malcontents. An army was levied of near 20,000 foot, and 3000 horse; and was put under the command of the earl of Arundel, a nobleman of great family, but celebrated neither for military nor political abilities. The earl of Essex, a man of strict honour, and extremely popular, especially among the soldiery, was appointed lieutenant-general: The earl of Holland was general of the horse. The king himself joined the army, and he summoned all the peers of England to attend him. The whole had the appearance of a splendid court rather than a military armament, and in this situation the camp arrived at Berwick.

The Scottish army was equally numerous with that of the king, but inferior in cavalry. The officers had more experience; and the soldiers, though ill disciplined and armed, were animated, as well by the national aversion to England, and the dread of becoming a province to their old enemy, as by that religious enthusiasm which was the occasion of the war. Yet so prudent were their leaders, that they immediately sent very submissive messages to the king, and craved leave to be admitted to a treaty.—Charles, as usual, took the worst course. He concluded a sudden pacification, in which it was stipulated, that he should withdraw his fleet and army; that within 48 hours the Scots should dismiss their forces; that the king's forts should be restored to him; his authority be acknowledged; and a general assembly and parliament be immediately summoned, in order to compose all differences.

This peace was of no long duration. Charles could not prevail on himself to abandon the cause of episcopacy, and secretly intended to seize every favourable opportunity to recover the ground he had lost. The assembly, on the other hand, proceeded with the utmost fury and violence. They voted episcopacy to be unlawful in the church of Scotland: they stigmatized the canons and liturgy as Popish: they denominated the high commission tyranny. The parliament which sat after the assembly, advanced pretensions which tended to diminish the civil power of the monarch; and what probably affected Charles still more, they were proceeding to ratify the acts of assembly, when by the king's instructions Traquair the commissioner prorogued them. And on account of these claims, which might have been easily foreseen, war was recommenced the same year.

No sooner had Charles concluded the peace, than he found himself obliged to disband his army, on account of his want of money; and as the soldiers had been held together merely by mercenary views, it was not possible, without great trouble, expence, and loss of time, to reassemble them. On the contrary, the covenants, in dismissing their troops, had been careful to preserve nothing but the appearance of a pacification. The officers had orders to be ready on the first summons: The soldiers were warned not to think the nation secure from an English invasion: And the religious zeal which animated all ranks of men made them immediately fly to their standards, as soon as their trumpet was sounded by their spiritual and temporal leaders.

In 1640, however, the king made shift to draw an army together; but finding himself unable to support them, was obliged to call a parliament after an intermission of above 11 years. As the sole design of the king's calling this parliament was to obtain a supply, and the only reason they had for attending was to procure a redress of grievances, it is not to be supposed there could be any good agreement between them. The king accordingly insisted for money, and the parliament on their grievances, till a dissolution ensued.—To add to the unpopularity of this measure, the king, notwithstanding his dissolving the parliament, allowed the convocation to sit; a practice of which, since the reformation, there had been very few examples, and which was now by many deemed very irregular. Besides granting to the king a supply from the spirituality, the convocation, jealous of innovations similar to those which had taken place in Scotland, imposed an oath on the clergy and the graduates in the universities, by which every one swore to maintain the established government of the church, by archbishops, bishops, deans, chapters, &c. These steps were deemed illegal, because not ratified by consent of parliament; and the oath, containing an &c. in the middle of it, became a subject of general ridicule.

The king, disappointed of parliamentary subsidies, was obliged to have recourse to other expedients. The ecclesiastical subsidies served him in some stead; and it seemed but just that the clergy should contribute to the expence of a war which had been in a great measure of their own raising. He borrowed money from his ministers and courtiers; and so much was he beloved among them, that above 300,000 l. were subscribed in a few days. Some attempts were made towards forcing a loan from the citizens; but still repelled by the spirit of liberty, which was now become unconquerable. A loan of 40,000 l. was extorted from the Spanish merchants who had bullion in the tower. Coat and conduct money for the soldiery was levied on the counties; an ancient practice, but which was supposed to be abolished by the petition of right. All the pepper was bought from the East India Company upon trust; and sold, at a great discount, for ready money. A scheme was propoed for coining two or three hundred thousand pounds of base money. Such were the extremities to which Charles was reduced. The fresh difficulties, which amidst the present distresses were every day raised, with regard to the payment of ship-money, obliged him to exert continual acts of authority, augmented extremely the discontents of the people,

Britain.

86
A parliament called.

87
Dissolved.

88
Charles distressed for money.

84
Peace concluded.

85
War again declared.

Britain.

Britain.

ple, and increased his indigence and necessities.

The present expedients, however, enabled the king, though with great difficulty, to march his army, consisting of 19,000 foot and 2000 horse. The earl of Northumberland was appointed general; the earl of Strafford, who was called over from Ireland, lieutenant-general; lord Conway, general of the horse. A small fleet was thought sufficient to serve the purposes of this expedition. The Scots, though somewhat superior, were sooner ready than the king's army, and marched to the borders of England. Notwithstanding their warlike preparations and hostile attempts, the covenanters still preserved the most submissive language to the king; and entered England with no other design, they said, than to obtain access to the king's presence, and lay their humble petition at his royal feet. At Newburn upon Tyne they were opposed by a detachment of 4500 men under Conway, who seemed resolute to dispute with them the passage of the river. The Scots first intreated them, with great civility, not to stop them in their march to their gracious sovereign; and then attacked them with great bravery, killed several, and chased the rest from their ground. Such a panic seized the whole English army, that the forces at Newcastle fled immediately to Durham; and not yet thinking themselves safe, they deserted that town, and retreated into Yorkshire.

The Scots continued to advance; they dispatched messengers to the king, who was now arrived at York. They took care, after the advantage they had gained, to redouble their expressions of loyalty, duty, and submission to his person; and they even made apologies full of sorrow and contrition for their late victory. Charles was in a very distressed condition; and, in order to prevent the further advance of the Scots, agreed to a treaty, and named 16 English noblemen to meet with 11 Scots commissioners at Rippon. Strafford, upon whom, by reason of Northumberland's sickness, the command of the army had devolved, advised Charles rather to put all to hazard, than submit to such unworthy terms as he saw would be imposed upon him. He advised him to push forward and attack the Scots, and bring the affair to a quick decision; and if he was ever so unsuccessful, nothing worse could befall him than what from his inactivity he would certainly be exposed to; and, to shew how easily this project might be executed, he ordered an assault to be made on some quarters of the Scots, and gained an advantage over them. This salutary advice Charles had not resolution to follow. He therefore resolved to call a council of the peers; and as he foresaw that they would advise him to call a parliament, he told them in his first speech, that he had already taken that resolution. In order to subvert both armies (for the king was obliged to pay his enemies, in order to save the northern counties), Charles wrote to the city, desiring a loan of 200,000 l. And the peers at York, whose authority was now much greater than that of their sovereign, joined in the same request.

The parliament met November 3^d 1640: the house of commons had never been observed so numerous; and, that they might strike a decisive blow at once against the court they began with the impeachment of the earl of Strafford. That nobleman, who was considered as prime minister, both on account of the credit he possessed with his master, and his own uncommon vigour and

capacity, had now the misfortune of having incurred the hatred of all the three kingdoms. The Scots looked upon him as the capital enemy of their country. He had engaged the parliament of Ireland to advance large subsidies to be employed in a war against them: he had levied an army of 9000 men, with which he had menaced all their western coast: he had obliged the Scots who lived under his government to renounce the covenant, &c.: he had governed Ireland, first as deputy, and then as lord-lieutenant, during eight years, with great vigilance, activity, and prudence, but with very little popularity. In a nation so averse to the English government and religion, these very virtues were sufficient to draw on him the public hatred. His manners, besides, were at bottom haughty, rigid, and severe; and no sooner did adversity begin to seize him, than the concealed aversion blazed up at once, and the Irish parliament used every expedient to aggravate the charge against him.

The universal discontent which prevailed throughout the English nation was all pointed against the earl of Strafford; though for no other reason but because he was the minister of state whom the king most favoured and trusted. His extraction was honourable, his paternal fortune considerable: yet envy attended his sudden and great elevation; and his former associates in popular councils, finding that he owed his advancement to the desertion of their cause, represented him as the great apostate of the commonwealth, whom it behoved them to sacrifice as a victim to public justice.

From so terrible a combination against a single person, nothing else could be expected than what really happened. Strafford was impeached, most unjustly condemned, and at last executed, in the year 1641. It was not without extreme difficulty that the king could be brought to consent to his execution. He came to the house of lords, where he expressed his resolution never to employ Strafford again in any public business; but with regard to the treason for which he was condemned, he professed himself totally dissatisfied. The commons voted it a breach of privilege for the king to take notice of any bill depending before the house. Charles did not perceive, that his attachment to Strafford was the chief motive for the bill; and the greater proof he gave of this attachment to his favourite minister, the more inevitable did he render his destruction. The house of lords were intimidated, by popular violence, into passing the bill of attainder against the unfortunate earl. The same battery was next employed to force the king's assent. The populace flocked about Whitehall, and accompanied their demand of justice with the loudest clamours and most open menaces. A thousand idle reports of conspiracies, insurrections, and invasions, were spread abroad. On whatever side the king cast his eyes, he saw no resource nor security. All his servants, consulting their own safety rather than their master's honour, declined interposing with their advice between him and his parliament. The queen, terrified at the appearance of so great danger, pressed Charles, with tears, to satisfy his people in this demand, which it was hoped would finally content them. Archbishop Juxon alone had the courage to advise him, if he did not approve of the bill, by no means to consent to it.

Strafford, hearing of the king's irresolution and anxiety,

89
Royallists
defeated at
Newburn.

92
Unjustly ex-
ecuted.

93
Distress of
the king on
account of
his execu-
tion.

90
Parliament
meets.

91
Unhappy
situation of
Strafford.

Britain.

xiety, wrote to him a letter, in which he desired his own execution, in order to give peace to the nation: and at last, after the most violent anxiety and doubt, Charles granted a commission to four noblemen, in his name, to give the royal assent to the bill; flattering himself, perhaps, that as neither his will consented to the deed, nor was his hand immediately engaged in it, he was the more free from all the guilt which attended it. These commissioners he empowered at the same time to give his assent to a bill yet more fatal to himself, viz. That the present parliament should not be dissolved, prorogued, or adjourned, without their own consent.

94 Charles renders the parliament perpetual.

95 His reasons for this step.

By this last bill Charles rendered the power of his enemies perpetual as it was already uncontrollable. The reason of this extraordinary step was, that the commons, from policy, more than necessity, had embraced the expedient of paying the two armies by borrowing money from the city. These loans they repaid afterwards by taxes levied on the people. At last the citizens, either of themselves, or by suggestion, began to start difficulties with regard to a farther loan which was demanded. "We make no scruple of trusting the parliament, (said they), were we certain that the parliament was to continue till our repayment. But, in the present precarious situation of affairs, what security can be given us for our money?" In order to obviate this objection, the abovementioned bill was suddenly brought in, and having passed both houses with great rapidity, was at last brought to the king; who, being oppressed with grief on account of the unhappy fate of Strafford, did not perceive the pernicious consequence of the bill.

96 Land imprisoned.

97 New crime of delinquency.

All this time the commons had ruled in other respects with an uncontrollable sway. Soon after the impeachment of Strafford, Laud was accused of high treason, and committed to custody. To avoid the like fate, lord keeper Finch and secretary Windebank fled, the one into Holland, the other into France. The house instituted a new species of guilt, termed *delinquency*: those who had exercised the powers necessary for the defence of the nation during the late military operations, were now called *delinquents*. In consequence of this determination, many of the nobility and prime gentry of the nation, while only exerting, as they justly thought, the legal powers of magistracy, found themselves unexpectedly involved in this new crime of delinquency. The commons, however, by their institution, reaped this multiplied advantage; they disarmed the crown, they established the maxims of rigid law and liberty, and they spread the terror of their own authority. All the sheriffs who had formerly exacted ship-money, though by the king's express command, were now declared delinquents. The farmers and officers of the customs who had been employed during so many years in levying tonnage, poundage, &c. were likewise denominated criminals of the same kind, and were afterwards glad to compound for a pardon by paying 150,000*l*. Every discretionary or arbitrary sentence of the star-chamber and high commission courts, which from their very nature were arbitrary, underwent a severe scrutiny; and all those who had concurred in such sentences, were voted to be liable to the penalties of law. No minister of the king, no member of the council, but what found himself exposed by this deter-

mination. The judges who had formerly given judgment against Hambden for refusing to pay ship-money, were accused before the peers, and obliged to find security for their appearance. Berkley, a judge of the king's bench, was seized by order of the house, even when sitting in his tribunal. The faction of the lords and commons, as well as that of the king, was declared necessary for the confirmation of ecclesiastical canons. Monopolists and projectors, if of the king's party, were now expelled the house; but one Mildmay, a notorious monopolist, was allowed to keep his seat, because he was of the popular party. In short, the constitution was completely new-modelled; and during the first period of the transactions of this remarkable parliament, if we except Strafford's attainder, their merits in other respects so much overbalance their mistakes, as to intitle them to very ample praises from all lovers of liberty. Not only were former abuses remedied, and grievances redressed: great provision for the future was made by excellent laws against the return of the like complaints. And if the means by which they obtained such mighty advantages favoured often of artifice, sometimes of violence; it is to be considered, that revolutions of government cannot be effected by mere force of argument and reasoning; and that, factions being once excited, men can neither so firmly regulate the tempers of others, nor their own, as to ensure themselves against all exorbitancies.

Had the parliament stopped here, it had been happy for the nation; but they were now resolved to be satisfied with nothing less than the total abolition of monarchy. The king had promised to pay a visit, this summer, to his subjects in Scotland, in order to settle their government; and though the English parliament was very importunate with him to lay aside that journey, they could not prevail with him so much as to delay it. Having failed in this, they appointed a small committee of both houses to attend him, in order, as was pretended, to see the articles of pacification executed, but really to be spies upon the king, to extend still farther the ideas of parliamentary authority, as well as eclipse his majesty. Endeavours were even used, before Charles's departure, to have a protector of the kingdom appointed, with a power to pass laws without having recourse to the king. About this time, the king concluded the marriage of the princess Mary, with William prince of Orange. He did not conclude this Mary with alliance without communicating his intentions to parliament, who were very well satisfied with the proposal. They adjourned from September 9th, to October 20th, 1641.

99 Marriage of the princess Mary with the prince of Orange.

Charles arrived in Scotland August 14th 1641, with a design to give full satisfaction if possible to this restless kingdom. Some good regulations were made; the bench of bishops, and lords of articles, were abolished; it was ordained that no man should be created a Scottish peer, who possessed not 10,000 marks (above 500*l*.) of annual rent in the kingdom; a law for triennial parliaments was likewise enacted; and it was ordained, that the last act of every parliament should be to appoint the time and place for holding the parliament next ensuing; the king was also deprived of that power formerly exercised, of issuing proclamations which enjoined obedience under the penalty of treason. But the most fatal blow given to royal authority, and what

100 Charles arrives in Scotland.

101 His great concessions.

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in a manner dethroned the prince, was an article, that no member of the privy-council, in whose hands, during the king's absence, the whole administration lay, no officer of state, none of the judges, should be appointed but by advice and approbation of parliament. Charles even agreed to deprive of their seats four judges who had adhered to his interests; and their place was supplied by others more agreeable to the ruling party. Several of the covenants were also sworn of the privy-council; and all the ministers of state, counsellors and judges, were, by law, to hold their places during life or good behaviour. The king, while in Scotland, conformed himself to the established church; he bestowed pensions and preferments on Henderfon, Gillespy, and other popular preachers; he practised every art to soften, if not to gain, his greatest enemies; the earl of Argyle was created a marquis, Lord London an earl, and Lesly was dignified with the title of *Lord Leven*. But though Charles was thus obliged to heap favours on his enemies and overlook his friends, the former were not satisfied, as believing all he did proceeded from artifice and necessity; while some of the latter were disgusted, and thought themselves ill rewarded for their past services.

101
English parliament desire a guard.

Argyle and Hamilton, being seized with an apprehension, real or pretended, that the earl of Crawford and others meant to assassinate them, left the parliament suddenly, and retired into the country: but, upon invitation and assurances, returned in a few days. This event, which in Scotland had no visible consequence, was commonly denominated the *incident*; but though the incident had no effect in Scotland, it was attended with very serious consequences in England. The English parliament immediately took the alarm; or rather probably were glad of the hint: they insinuated to the people, that the *maligants*, so they called the king's party, had laid a plot at once to murder them and all the godly in both kingdoms. They applied therefore to Essex, whom the king had left general of the south of England; and he ordered a guard to attend them.

103
Rebellion breaks out in Ireland.

In the mean time a most dangerous rebellion broke out in Ireland, with circumstances of unparalleled horror, bloodshed, and devastation. The old Irish, by the wife conduct of James, had been fully subdued, and proper means taken for securing their dependence and subjection for the future; but their old animosity still remained, and only wanted an occasion to exert itself. This they obtained from the weak condition to which Charles was reduced, and this was made use of in the following manner.

One Roger More, a gentleman descended from an ancient Irish family, but of narrow fortune, first formed the project of expelling the English, and asserting the independency of his native country. He secretly went from chieftain to chieftain, and roused up every latent principle of discontent. He maintained a close correspondence with Lord Macguire, and Sir Phelim O Neale, the most powerful of the old Irish; and by his persuasions soon engaged not only them, but the most considerable persons of the nation, into a conspiracy; and it was hoped, the English of the *pale*, as they were called, or the old English planters, being all catholics, would afterwards join the party which restored their religion to its ancient splendor and authority. The

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plan was, that Sir Phelim O Neale, and the other conspirators, should begin an insurrection on one day throughout the provinces, and should attack all the English settlements; and that on the very same day, Lord Macguire and Roger More should surprize the castle of Dublin. They fixed on the beginning of winter for the commencement of this revolt; that there might be more difficulty in transporting forces from England. Succours to themselves, and supplies of arms, they expected from France, in consequence of a promise made them by cardinal Richelieu; and many Irish officers who had served in the Spanish troops, had given assurances of their concurrence, as soon as they saw an insurrection entered upon by their catholic brethren. News, which every day arrived from England, of the fury expressed by the commons against all Papists, struck fresh terror into the Irish nation, stimulated the conspirators to execute their fatal purpose, and assured them of the concurrence of their countrymen.

Such a propensity was discovered in all the Irish to revolt, that it was deemed unnecessary as well as dangerous to trust the secret in many hands; and though the day appointed drew nigh, no discovery had yet been made to government. The king, indeed, had received information from his ambassadors, that something was in agitation among the Irish in foreign parts; but though he gave warning to the administration in Ireland, his intelligence was entirely neglected. They were awakened from their security only that very day before the commencement of hostilities. The castle of Dublin, by which the capital was commanded, contained arms for 10,000 men, with 35 pieces of cannon, and a proportionable quantity of ammunition. Yet was this important place guarded, and that too without any care, by no greater force than 50 men. Macguire and More were already in town with a numerous band of their retainers; others were expected that night; and next morning they were to enter upon what they esteemed the easiest of all enterprises, the surprisal of the castle. O Conolly, however, an Irishman, but a Protestant, discovered the conspiracy. The justices and council fled immediately to the castle, and reinforced the guards. The city was immediately alarmed, and all the Protestants prepared for defence. More escaped, but Macguire was taken; and Mahone, one of the conspirators, being likewise seized, first discovered to the justices the project of a general insurrection.

But though O Conolly's discovery saved the castle from a surprize, Mahon's confession came too late to prevent the intended insurrection. O Neale and his confederates had already taken arms in Ulster. The houses, cattle, and goods of the English were first seized. Those who heard of the commotions in their neighbourhood, instead of deserting their habitations, and assembling together for mutual protection, remained at home in hopes of defending their property; and fell thus separately into the hands of their enemies. An universal massacre now commenced, accompanied with circumstances of unequalled barbarity. No age, sex, or condition, was spared. All connections were dissolved, and death was dealt by that hand from which protection was implored and expected. All the tortures which wicked cruelty could devise, all the lingering

104
Horrid cruelties of the rebels.

ing

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ing pains of body, the anguish of mind, the agonies of despair, could not satiate revenge excited without injury, and cruelty derived from no cause. Such enormities, in short, were committed, that though attested by undoubted evidence, they appear almost incredible. The stately buildings or commodious habitations of the planters, as if upbraiding the sloth and ignorance of the natives, were consumed with fire, or laid level with the ground; and where the miserable owners, shut up in their houses, and preparing for defence, perished in the flames, together with their wives and children, a double triumph was afforded to their insulting foes. If any where a number assembled together, and resolved to oppose the assassins; they were disarmed by capitulations, and promises of safety, confirmed by the most solemn oaths. But no sooner had they surrendered, than the rebels, with perfidy equal to their cruelty, made them share the fate of their unhappy countrymen. Others tempted their prisoners, by the fond love of life, to embroil their hands in the blood of friends, brothers, or parents; and having thus rendered them accomplices in their own guilt, gave them that death which they sought to shun by deserting it.

Such were the barbarities by which Sir Phelim O Neale and the Irish in Ulster signalized their rebellion. More, shocked at the recital of these enormities, flew to O Neale's camp; but found that his authority, which was sufficient to excite the Irish to a rebellion, was too feeble to restrain their inhumanity. Soon after, he abandoned the cause, and retired to Flanders. From Ulster, the flames of rebellion diffused themselves in an instant over the other three provinces of Ireland. In all places, death and slaughter were not uncommon; though the Irish in these other provinces pretended to act with moderation and humanity. But cruel and barbarous was their humanity! Not content with expelling the English from their houses, they stripped them of their very clothes, and turned them out naked and defenceless to all the severities of the season. The heavens themselves, as if conspiring against that unhappy people, were armed with cold and tempest un usual to the climate, and executed what the sword had left unfinished. By some computations, those who perished by all these cruelties are supposed to amount to 150 or 200,000. But by the most reasonable and moderate, they are made to amount only to 40,000; though probably even this account is not free of exaggeration.

The English of the pale, who probably were not at first in the secret, pretended to blame the insurrection, and to detest the barbarity with which it was accompanied. By their protestations and declarations they engaged the justices to supply them with arms, which they promised to employ in defence of government. But in a little time, the interests of religion were found to be more prevalent over them than regard and duty to their native country. They chose lord Gormonstoun their leader; and, joining the old Irish, rivalled them in every act of cruelty towards the English Protestants. Besides many smaller bodies, dispersed over the kingdom, the main army of the rebels amounted to 20,000 men, and threatened Dublin with an immediate siege. Both the English and Irish rebels conspired in one impotence, by which they seduced many of their countrymen. They pretended authority from the king

and queen, but especially the latter, for their insurrection; and they affirmed that the cause of their taking arms was to vindicate the royal prerogative, now invaded by the puritanical parliament. Sir Phelim O Neale, having found a royal patent in the house of lord Caulfield, whom he had murdered, tore off the seal, and affixed it to a commission which he had forged for himself.

The king received intelligence of this insurrection while in Scotland, and immediately acquainted the Scots parliament with it. He hoped, as there had all along been such an outcry against Popery, that now, when that religion was appearing in its blackest colours, the whole nation would vigorously support him in the suppression of it. But here he found himself mistaken. The Scots considering themselves now as a republic, and conceiving hopes from the present distresses of Ireland, they resolved to make an advantageous bargain for the succours with which they should supply the neighbouring nation. Except dispatching a small body of forces, to support the Scots colonies in Ulster, they would, therefore, go no farther than to send commissioners to London, in order to treat with the parliament, to whom the sovereign power was in reality transferred. The king too, sensible of his utter inability to subdue the Irish rebels, found himself obliged, in this exigency, to have recourse to the English parliament, and depend on their assistance for supply. He told them that the insurrection was not, in his opinion, the result of any rash enterprise, but of a formed conspiracy against the crown of England. To their care and wisdom, therefore, he said, he committed the conduct and prosecution of the war, which, in a cause so important to national and religious interests, must of necessity be immediately entered upon, and vigorously pursued.

The English parliament, now re-assembled, discovered in each vote the same dispositions in which they had separated. Nothing less than a total abolition of the monarchy would serve their turn. But this project it had not been in the power of the popular leaders to have executed, had it not been for the passion which seized the nation for the presbyterian discipline, and the wild enthusiasm which at that time attended it. By the difficulties and distresses of the crown, the commons, who possessed alone the power of supply, had aggrandized themselves; and it seemed a peculiar happiness, that the Irish rebellion had succeeded, at such a critical juncture, to the pacification in Scotland. That expression of the king's, by which he committed to them the care of Ireland, they immediately laid hold of, and interpreted in the most unlimited sense. They had on other occasions been gradually encroaching on the executive power of the crown, which forms its principal and most natural branch of authority; but with regard to Ireland, they at once assumed it, fully and entirely, as if delivered over to them by a regular gift or assignment. And to this usurpation the king was obliged passively to submit, both because of his inability to resist, and lest he should expose himself still more to the charge of favouring the rebels; a reproach eagerly thrown upon him by the popular party as soon as they heard that the Irish pretended to act by his commission. Nay, to complete their character, while they pretended the utmost zeal against the insurgents, they took no

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105
Scots refuse
to assist in
quelling the
rebellion.

106
Infamous
conduct of
the English
parliament.

Britain.

steps for its suppression, but such as likewise gave them the superiority in those commotions which they foresaw must be so soon excited in England. They levied money under pretence of the Irish expedition, but reserved it for purposes which concerned them more nearly: they took arms from the king's magazines, but still kept them with a secret intention of making use of them against himself: whatever law they deemed necessary for aggrandizing themselves, they voted, under colour of enabling them to recover Ireland; and if Charles withheld his royal assent, the refusal was imputed to those pernicious counsels which had at first excited the Popish rebellion, and which still threatened total ruin to the Protestant interest throughout his dominions. And though no forces were for a long time sent over into Ireland, and very little money remitted during the extreme distress of that kingdom; so strong was the people's attachment to the commons, that the fault was never imputed to those pious zealots, whose votes breathed nothing but death and destruction to the Irish rebels.

107
King re-
turns from
Scotland.

The conduct of the parliament towards the king now became exceedingly unreasonable, unjust, and cruel. It was thought proper to frame a general remonstrance of the state of the kingdom; and accordingly the committee, which at the first meeting of the parliament had been chosen for that purpose, were commanded to finish their undertaking. The king returned from Scotland November 25th 1641. He was received in London with the shouts and acclamations of the populace, and with every demonstration of regard and affection. Sir Richard Bournay, lord mayor, a man of great merit and authority, had promoted these favourable dispositions; and had engaged the populace, who so lately insulted the king, and who so soon after made furious war upon him, to give him these marks of their dutiful attachment. But all the pleasure which Charles reaped from this joyful reception was soon damped by the remonstrance of the commons, which was presented to him together with a petition of the like nature. The bad counsels which he followed were there complained of; his concurrence in the Irish rebellion plainly insinuated; the scheme laid for the introduction of popery and superstition inveighed against; and for a remedy to all these evils, the king was desired to entrust every office and command to persons in whom his parliament should have cause to confide. By this phrase, which was very often repeated in all the memorials and addresses of that time, the commons meant themselves and their adherents. To this remonstrance Charles was obliged to make a civil reply, notwithstanding his subjects had transgressed all bounds of respect and even good manners in their treatment of their sovereign.

108
Commons
assume the
sovereignty.

It would be tedious to point out every invasion of the prerogative now attempted by the commons: but finding themselves at last likely to be opposed by the nobility, who saw their own depression closely connected with that of the crown, they openly told the upper house, that "they themselves were the representatives of the whole body of the kingdom, and that the peers were nothing but individuals, who held their seats in a particular capacity; and therefore, if their lordships will not consent to acts necessary for the preservation of the people, the commons, together with such of the lords as are more sensible of the danger, must join to-

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gether and represent the matter to his majesty." Every method proper for alarming the populace was now put in practice. The commons affected continual fears of destruction to themselves and to the whole nation. They excited the people by never ceasing inquiries after conspiracies, by reports of insurrections, by feigned intelligence of invasions from abroad, and by discoveries of dangerous combinations at home amongst Papists and their adherents. When Charles dismissed the guard which they had ordered during his absence, they complained; and, upon his promising them a new guard under the command of the earl of Lindsey, they absolutely refused the offer: they ordered halberds to be brought into the hall where they assembled, and thus armed themselves against those conspiracies with which they pretended they were hourly threatened. Several reduced officers, and young gentlemen of the inns of court, during this time of distress and danger, offered their service to the king. Between them and the populace there passed frequent skirmishes, which ended not without bloodshed. By way of reproach, these gentlemen gave the rabble the name of *round-heads*, on account of their short cropped hair; while they distinguished the others by the name of *cavaliers*. And thus the nation, which was before sufficiently provided with religious as well as civil causes of quarrel, was also supplied with party-names, under which the factions might rendezvous and signalize their mutual hatred.

109
Round-heads,
and *Cavaliers*.

These tumults continued, to increase about Westminster and Whitehall. The cry continually resounded against bishops and *rotten-hearted lords*. The former especially, being easily distinguishable by their habit, and being the object of violent hatred to all the sectaries, were exposed to the most dangerous insults. The archbishop of York, having been abused by the populace, hastily called a meeting of his brethren. He gave advice a protestation was drawn and addressed to the king and the house of lords. The bishops there set forth, that though they had an undoubted right to sit and vote in parliament, yet in coming thither they had been menaced, assaulted, affronted, by the unruly multitude, and could no longer with safety attend their duty in the house. For this reason they protested against all laws, votes, and resolutions, as null and invalid, which should pass during the time of their forced absence. This protestation, which, though just and legal, was certainly ill-timed, was signed by twelve bishops, and communicated to the king, who hastily approved of it. As soon as it was presented to the lords, that house desired a conference with the commons, whom they informed of this unexpected protestation. The opportunity was seized with joy and triumph. An impeachment of high treason was immediately sent up against the bishops, as endeavouring to subvert the fundamental laws, and to invalidate the authority of the legislature. They were, on the first demand, sequestered from parliament, and committed to custody. No man in either house ventured to speak a word in their vindication; so much was every one displeased at the egregious imprudence of which they had been guilty. One person alone said, that he did not believe them guilty of high treason; but that they were stark mad, and therefore desired they might be sent to bedlam.

110
Bishops re-
tire from
the house of
lords.

This was a fatal blow to the royal interest; but it soon felt a much greater from the imprudence of the king

Britia.

111
ix mem-
bers of par-
liament im-
peached by
the king's
order.

king himself. Charles had long suppressed his resentment, and only strove to gratify the commons by the greatness of his concessions; but finding that all his compliance had but increased their demands, he could no longer contain. He gave orders to Herbert his attorney-general to enter an accusation of high treason, in the house of peers, against Kimbolton, one of the most popular men of his party, together with five commons, Sir Arthur Hasleir, Hollis, Hambden, Pym, and Strode. The articles were, That they had traitorously endeavoured to subvert the fundamental laws and government of the kingdom, to deprive the king of his regal power, and to impose on his subjects an arbitrary and tyrannical authority; that they had invited a foreign army to invade the kingdom; that they had aimed at subverting the very rights and being of parliaments; and had actually raised and countenanced tumults against the king. Men had scarce leisure to wonder at the precipitancy and imprudence of this impeachment, when they were astonished by another measure still more rash and unsupported. A sergeant at arms, in the king's name, demanded of the house the five members, and was sent back without any positive answer. This was followed by a conduct still more extraordinary. The next day, the king himself was seen to enter the house of commons alone, advancing through the hall, while all the members stood up to receive him. The speaker withdrew from his chair, and the king took possession of it. Having seated himself, and looked round him for some time, he told the house, that he was sorry for the occasion that forced him thither; that he was come in person to seize the members whom he had accused of high treason, seeing they would not deliver them up to his sergeant at arms. Then addressing himself to the speaker, he desired to know whether any of them were in the house: but the speaker, falling on his knees, replied, that he had neither eyes to see, nor tongue to speak, in that place, but as the house was pleased to direct him; and he asked pardon for being able to give no other answer. The king sat for some time, to see if the accused were present; but they had escaped a few minutes before his entry. Thus disappointed, perplexed, and not knowing on whom to rely, he next proceeded, amidst the invectives of the populace, who continued to cry out, *Privilege! Privilege!* to common council of the city, and made his complaint to them. The common council answered his complaints by a contemptuous silence; and on his return, one of the populace, more insolent than the rest, cried out, "To your tents, O Israel!" a watch-word among the Jews, when they intended to abandon their princes.

112
Bad conse-
quences of
this attempt

When the commons assembled the next day, they pretended the greatest terror; and passed an unanimous vote that the king had violated their privileges, and that they could not assemble again in the same place, till they should obtain satisfaction, and have a guard for their security. The king had retired to Windsor, and from thence he wrote to his parliament, making every concession, and promising every satisfaction in his power. But they were resolved to accept of nothing unless he would discover his advisers in that illegal measure; a condition to which, they knew, that without rendering himself for ever vile and contemptible, he could not possibly submit.

The commons had already stripped the king of almost

all his privileges; the bishops were fled, the judges were intimidated; it now only remained, after securing the church and the law, that they should get possession of the sword also. The power of appointing governors and generals, and of levying armies, was still a remaining prerogative of the crown. Having therefore first magnified their terrors of Popery, which perhaps they actually dreaded, they proceeded to petition that the Tower might be put into their hands; and that Hull, Portsmouth, and the fleet, should be intrusted to persons of their chusing. These were requests, the complying with which subverted what remained of the constitution; however, such was the necessity of the times, that they were first contested, and then granted. At last, every compliance only increasing the avidity of making fresh demands, the commons desired to have a militia, raised and governed by such officers and commanders as they should nominate, under pretence of securing them from the Irish Papists, of whom they were under the greatest apprehension.

It was here that Charles first ventured to put a stop to his concessions; and that not by a refusal, but a delay. He was at that time at Dover attending the queen and the prince of Orange, who had thought it prudent to leave the kingdom. He replied to the petition, that he had not now leisure to consider a matter of such great importance; and therefore would defer an answer till his return. But the commons were well aware, that though this was depriving him even of the shadow of power, yet they had now gone too far to recede; and they were therefore desirous of leaving him no authority whatever, being conscious that themselves would be the first victims to its fury. They alleged, that the dangers and distempers of the nation were such as could endure no longer delay; and unless the king should speedily comply with their demands, they should be obliged, both for his safety and that of the kingdom, to embody and direct the militia by the authority of both houses. In their remonstrances to the king, they desired even to be permitted to command the army for an appointed time; which so exasperated him, that he exclaimed, "No, not for an hour." This peremptory refusal broke off all further treaty; and both sides were now resolved to have recourse to arms.

116
War re-
solved
on be-
tween the
king and
parliament

Charles, taking the prince of Wales with him, retired to York, where he found the people more loyal, and less infected with the frenzy of the times. He found his cause there backed by a more numerous party among the people than he had expected. The queen, who was in Holland, was making successful levies of men and ammunition by selling the crown-jewels. But before war was openly declared, the shadow of a negotiation was carried on, rather with a design to please the people than with any view of reconciliation. Nay, that the king might despair of all composition, the parliament sent him the conditions on which they were willing to come to an agreement. Their demands were contained in 19 propositions, and amounted to a total abolition of monarchical authority. They required that no man should remain in the council who was not agreeable to parliament; that no deed of the king's should have validity unless it passed the council, and was attested under their hand; and that all the officers of state should be chosen with consent of parliament; that none of the royal family should marry without consent of parliament.

117
Shameful
requisitions
of parlia-
ment.

Britia.

114
Commons
demand pos-
session of the
executive
power of
the state.

115
Refused by
the king.

Britain.

Britain.

118
Rejected by
Charles.

parliament or council; that the laws should be executed against Catholics; that the votes of Popish lords should be excluded; that the reformation of the liturgy and church-government should take place according to the advice of parliament; that the ordinance with regard to the militia be submitted to; that the justice of parliament may pass upon all delinquents; that a general pardon be granted with such exceptions as should be advised by parliament; that the forts and castles be disposed of by consent of parliament; and that no peers be made but with consent of both houses. War on any terms was esteemed, by the king and all his counsellors, preferable to so ignominious a peace. Charles accordingly resolved to support his authority by force of arms. "His towns (he said) were taken from him; his ships, his army, and his money: but there still remained to him a good cause, and the hearts of his loyal subjects; which, with God's blessing, he doubted not would recover all the rest." Collecting therefore some forces, he advanced southwards, and erected his royal standard at Nottingham.

The king found himself supported in the civil war by the nobility and more considerable gentry. They, dreading a total confusion of rank from the fury of the populace, enlisted themselves under the banner of their monarch; from whom they received, and to whom they communicated, their lustre. The concurrence of the bishops and church of England also increased the adherents of the king; but it may be safely affirmed, that the high monarchical doctrines so much inculcated by the clergy, had never done him any good. The bulk of the nobility and gentry who now attended the king in his distresses, breathed the spirit of liberty as well as of loyalty: and in the hopes alone of his submitting to a limited and legal government they were willing to sacrifice their lives and fortunes.

On the other hand, the city of London, and most of the great corporations, took part with the parliament; and adopted with zeal those democratical principles on which these assemblies were founded. The example of the Dutch commonwealth too, where liberty had so happily supported industry, made the commercial part of the nation desire to see a like form of government established in England. Many families also, who had enriched themselves by commerce, saw with indignation, that, notwithstanding their opulence, they could not raise themselves to a level with the ancient gentry: they therefore adhered to a power by whose success they hoped to acquire rank and consideration.

119
Distressed
condition of
the royalists.

At first every advantage seemed to lie against the royal cause. The king was totally destitute of money. London and all the sea-ports, except Newcastle, being in the hands of parliament, they were secure of a considerable revenue; and the seamen naturally following the disposition of the ports to which they belonged; the parliament had the entire dominion of the sea. All the magazines of arms and ammunition they seized at first; and their fleet intercepted the greatest part of those sent by the queen from Holland. The king, in order to arm his followers, was obliged to borrow the weapons of the train bands, under promise of restoring them as soon as peace should be settled. The nature and qualities of his adherents alone, gave the king some compensation for all the advantages possessed by his adversaries. More bravery and activity were hoped for from

the generous spirit of the nobles and gentry, than from the base disposition of the multitude. And as the landed gentlemen, at their own expence, levied and armed their tenants, besides an attachment to their masters, greater force and courage were to be expected from these rustic troops, than from the vicious and enervated populace of cities. Had the parliamentary forces, however, exerted themselves at first, they might have easily dissipated the small number the king had been able to collect, and which amounted to no more than 800 horse, and 3000 foot; while his enemies were within a few days march of him with 6000 men. In a short time the parliamentary army were ordered to march to Northampton; and the earl of Essex who had joined them found the whole to amount to 15,000. The king's army too was soon reinforced from all quarters; but still, having no force capable of coping with the parliamentary army, he thought it prudent to retire to Derby, and from thence to Shrewsbury, in order to countenance the levies which his friends were making in those parts. At Wellington, a day's march from Shrewsbury, he made a rendezvous of all his forces, and caused his military orders to be read at the head of every regiment. That he might bind himself by reciprocal obligations, he here protested solemnly before his whole army, that he would maintain the Protestant religion according to the church of England; that he would govern according to the known statutes and customs of the kingdom; and particularly, that he would observe inviolable the laws to which he had given his consent during this parliament, &c.

While Charles lay at Shrewsbury, he received the news of an action, the first which had happened in these parts, and wherein his party was victorious. On the appearance of commotions in England, the princes Rupert and Maurice, sons of the unfortunate elector palatine, had offered their service to the king; and the former at that time commanded a body of horse which had been sent to Worcester in order to watch the motions of Essex, who was marching towards that city. No sooner had the prince arrived, than he saw some cavalry of the enemy approaching the gates. Without delay he briskly attacked them, as they were desfilng from a lane, and forming themselves. Colonel Sandys their commander was killed, the whole party routed, and pursued above a mile.

120
They gain
an advantage
over their
enemies.

In 1642, October 23^d, happened a general engagement at Edgehill, in which, though the royalists were at first victorious, their impetuosity lost the advantage they had gained, and nothing decisive happened. Five thousand men, it is said, were found dead on the field of battle. Soon after, the king took Banbury and Reading; and defeated two regiments of his enemies at Brentford, taking 500 prisoners. Thus ended the campaign in 1642; in which, though the king had the advantage, yet the parliamentary army amounted to 24,000 men, and was much superior to his; notwithstanding which, his enemies had been so far humbled as to offer terms of peace.

121
Battle of
Edgehill.

In 1643, the treaty was carried on, but without any cessation of hostilities: and indeed the negotiation went no farther than the first demand on each side; for the parliament, finding no likelihood of coming to an accommodation, suddenly recalled their commissioners. On the 27th of April, Reading surrendered to the parliament.

Britain.

122
The association
of the king.

123
Parliamentary forces
defeated at
Stratton.

124
Charles be-
sieves Glou-
cester.

125
He is forced
to raise the
siege.

126
Battle of
Newbury.

liamentary forces under the earl of Essex, who commanded a body of 18,000 men. The earl of Northumberland united in a league for the king the counties of Northumberland, Cumberland, Westmorland, and the bishopric; and engaged, some time after, other counties in the same association. The same nobleman also took possession of York, and dislodged the forces of the parliament at Tadcaster, but his victory was not decisive. Other advantages were also gained by the royalists; the most important of which was the battle of Stratton, where the poet Waller, who commanded the parliament's army, was entirely defeated, and forced to fly with only a few horse to Bristol. This happened on the 13th of July; and was followed by the siege of that city, which surrendered to prince Rupert on the 25th of the same month.

Though the taking of Bristol had cost the royalists dear, yet such a continued run of success had greatly dispirited the opposite party; and such confusion now prevailed at London, that some proposed to the king to march directly to that city, which it was hoped might be reduced either by an insurrection of the citizens, by victory, or by treaty, and thus an end put to the civil disorders at once. This advice, however, was rejected, on account of the great number of the London militia; and it was resolved first to reduce Gloucester, in consequence of which the king would have the whole course of the Severn under his command. The rich and malcontent counties of the west, having then lost all protection from their friends, might be enforced to pay large contributions as an atonement for their disaffection; an open communication could be preserved between Wales and these new conquests; and half the kingdom being entirely freed from the enemy, and thus united into one firm body, might be employed in re-establishing the king's authority throughout the remainder.

The siege of this city commenced August 10th; but being defended by Masey a resolute governor, and well garrisoned, made a vigorous defence. The consternation at London, however, was as great as if the enemy had been already at their gates; and in the midst of the general confusion, a design was formed by Waller of forcing the parliament to accept of some reasonable conditions of peace. He imparted his design to some others; but a discovery being made of their proceedings, he and two others were condemned to death. Waller, however, escaped with a fine of 10,000*l*. The city of Gloucester in the mean time was reduced to the utmost extremity; and the parliament, as their last resource, dispatched Essex with an army of 14,000 men, in order to force the king to raise the siege of that city. This he accomplished; and when he entered, found only one barrel of gunpowder left, and other provisions in the same proportion. On his return to London, he was intercepted by the king's army, with whom a most desperate battle ensued at Newbury which lasted till night. Though the victory was left undecided, Essex next morning proceeded on his march, and reached London in safety, where he received the applause for his conduct he deserved. The king followed him on his march; and having taken possession of Reading after the earl left it, he there established a garrison, and straitened by that means London and the quarters of the enemy.

Britain.

127
Advantages
gained by
Fairfax and
Cromwell.

128
Lord Fairfax
defeated
at Atherton.

In the north, during this summer, the earl, now created marquis of Newcastle, had raised a considerable force for the king; and great hopes of success were entertained from that quarter. There appeared, however, in opposition to him, two men on whom the event of the war finally depended, and who began about this time to be remarked for their valour and military conduct. These were, Sir Thomas Fairfax, son to the lord of that name; and Oliver Cromwell. The former gained a considerable advantage over the royalists at Wakefield, and took general Goring prisoner: the latter obtained a victory at Gainborough over a party commanded by the gallant Cavendish, who perished in the action. But both these defeats were more than compensated by the total rout of lord Fairfax at Atherton moor, and the dispersion of his army, which happened on the 31st of July. After this victory, the marquis of Newcastle sat down before Hull with an army of 15,000 men; but being beat off by a fall of the garrison, he suffered so much that he thought proper to raise the siege. About the same time, Manchester, who advanced from the eastern associated counties, having joined Cromwell and young Fairfax, obtained a considerable victory over the royalists at Horn castle; where the two last mentioned officers gained renown by their conduct and gallantry. And though fortune had thus balanced her favours, the king's party still remained much superior in those parts of England; and had it not been for the garrison of Hull, which kept Yorkshire in awe, a conjunction of the northern forces with the army in the south might have been made, and had probably enabled the king, instead of entering on the unfortunate, perhaps imprudent enterprise of Gloucester, to march directly to London, and put an end to the war. The battle of Newbury was attended with such loss on both sides, that it put an end to the campaign of 1643, by obliging both parties to retire into winter quarters.

The event of the war being now very doubtful, the king and parliament began both of them to look for assistance from other nations. The former cast his eyes on Ireland, the latter on Scotland. The parliament of England had ever invited the Scots, from the commencement of the civil dissensions, to interpose their mediation, which they knew would be very little favourable to the king, and which for that reason he had declined. Early in the spring of 1643, this offer of mediation had been renewed, with no better success than before. The commissioners were also empowered to press the king to a compliance with the Presbyterian worship and discipline. But this he absolutely refused, as well as to call a parliament in Scotland; so that the commissioners, finding themselves unable to prevail in any one of their demands, returned home highly dissatisfied. The English parliament being now in great distress, gladly sent commissioners to Edinburgh, to treat of a more close confederacy with the Scottish nation. The person they principally trusted to on this occasion was Sir Henry Vane, who in eloquence, address, capacity, as well as in art and dissimulation, was not surpassed even by any one in that age so famous for active talents. By his persuasions was framed at Edinburgh the SOLEMN LEAGUE AND COVENANT; which effaced all former protestations and vows taken in both kingdoms, and long maintained its credit and authority.

129
English par-
liament ask
assistance
from the
Scots.

130
Solemn
league and
covenant
framed.

Britain.

city. In this covenant, the subscribers, besides engaging mutually to defend each other against all opponents, bound themselves to endeavour, without respect of persons, the extirpation of popery and prelacy, superstition, heresy, and profaneness; to maintain the rights and privileges of parliaments, together with the king's authority; and to discover and bring to justice all incendiaries and malignants. They vowed also to preserve the reformed religion established in the church of Scotland; but by the artifice of Vane, no declaration more explicit was made with regard to England and Ireland, than that these kingdoms should be reformed according to the word of God, and the example of the purest churches.

Great were the rejoicings among the Scots, that they should be the happy instruments of extending their mode of religion, and dissipating the profound darkness in which the neighbouring nations were involved. And being determined that the sword should carry conviction to all refractory minds, they prepared themselves with great vigilance and activity for their military enterprises; so that, having added to their other forces the troops which they had recalled from Ireland, they were ready about the end of the year to enter England under their old general the earl of Leven, with an army of above 20,000 men. The king, in order to secure himself, concluded a cessation of arms with the Irish rebels, and recalled a considerable part of his army from Ireland. Some Irish catholics came over with these troops, and joined the royal army, where they continued the same cruelties and disorders to which they had been accustomed. The parliament voted, that no quarter in any action should ever be given them. But prince Rupert, by making some reprisals, soon repressed this inhumanity.

The campaign of 1644 proved very unfortunate to the royal cause. The forces brought from Ireland were landed at Moyne in North Wales, and put under the command of lord Biron. They besieged and took the castles of Hawarden, Beeston, Acton, and Deddington-house. No place in Cheshire or the neighbourhood now adhered to the parliament, except Nantwich; and to this place Biron laid siege in the depth of winter. Sir Thomas Fairfax, alarmed at so great a progress, assembled an army of 4000 men in Yorkshir; and having joined Sir William Brereton, was approaching to the camp of the royalists. Biron and his soldiers, elated with successes in Ireland, entertained a most profound contempt for their enemies. Fairfax suddenly attacked their camp. The swelling of the river by a thaw, divided one part of the army from another. That part exposed to Fairfax, being beat from their post, retired into the church at Acton, where being surrounded, they were all taken prisoners. The other retreated with precipitation; and thus was dissipated or rendered useless that body of forces which had come from Ireland.

This happened on the 25th of January; and on the 11th of April, Colonel Bellaſis was totally defeated at Selby in Yorkshir by Sir Thomas Fairfax, who had returned from Cheshire with his victorious forces. Being afterwards joined by lord Leven, the two generals sat down before the city of York; but being unable to invest that city completely, they were obliged to content themselves with incommoding it by a loose blockade. Hopeton, having as-

sembled a body of 14,000 men, endeavoured to break into Suffex, Kent, and the southern affociation, which seemed well disposed to receive him; but was defeated by Waller at Cherington. At Newark, however, prince Rupert totally defeated the parliamentary army which besieged that place; and thus preserved the communication open between the king's northern and southern quarters.

The great advantages the parliament had gained in the north, seemed now to second their unwarrantable enterprizes, and finally to promise them success. Manchester having taken Lincoln, had united his army to that of Leven and Fairfax; and York was now closely besieged by their numerous forces. That town, tho' vigorously defended by the marquis of Newcastle, was reduced to the last extremity, when prince Rupert, having joined Sir Charles Lucas who commanded Newcastle's horse, hastened to its relief with an army of 20,000 men. The Scots and parliamentary generals raised the siege, and drawing up on Marlton moor, proposed to give battle to the royalists. Prince Rupert approached the town by another quarter, and interposing the river Ouse between him and the enemy, safely joined his forces to those of Newcastle. The marquis endeavoured to persuade him, that having so successfully effected his purpose, he ought to be contented with the present advantages, and leave the enemy now much diminished by their losses, and discouraged by their ill success, to dissolve by those mutual diffensions which had begun to take place among them. The prince, however, hurried on by his natural impetuosity, gave immediate orders for fighting. The battle was lost, the royal army entirely pushed off the field, and the train of artillery taken. Immediately after this unfortunate action the marquis of Newcastle left the kingdom, and prince Rupert retired into Lancashire. The city of York was surrendered in a few days, and Newcastle soon after taken by storm.

This was a fatal blow to the royal cause, and far from being balanced by an advantage gained at Cropredy bridge by the king over Waller, or even by the disarming of Essex's forces, which happened on the 1st of September. On the 27th of October, another battle was fought at Newbury, in which the royalists were worsted, but soon after retrieved their honour at Dennington castle, which finished the campaign in 1644.

In 1645, a negotiation was again set on foot, and the commissioners met at Uxbridge on the 30th of January; but it was soon found impossible to come to any agreement. The demands of the parliament were exorbitant; and what was worse, their commissioners owned them to be nothing but preliminaries. The king was required to attain, and except from a general pardon, 40 of the most considerable of his English subjects, and 19 of his Scots, together with all the Popish recusants who had born arms for him. It was insisted that 48 more, with all the members of either house who had sat in the parliament called by the king at Oxford, all lawyers and divines who had embraced the king's party, should be rendered incapable of any office, be forbid the exercise of their profession, be prohibited from coming within the verge of the court, and forfeit the third of their estates to the parliament. It was required, that whoever had born arms for the king should forfeit the tenth of their estates; or if that

Britain.

133
York besieged by the parliamentary forces

134
Royalists defeated at Marlton moor.

131
Charles assisted by the Irish.

132
Irish forces dispersed.

135
Extravagant demands of the parliament.

did

Britain.

did not suffice, the sixth, for the payment of public debts. As if royal authority were not sufficiently annihilated by these terms, it was demanded that the court of wards should be abolished; that all the considerable officers of the crown, and all the judges, should be appointed by parliament; and that the right of peace and war should not be exercised without consent of parliament. A little before the commencement of this fruitless treaty, the parliament, to shew their determined resolution to proceed in the same haughty imperious method in which they had begun, brought to the block archbishop Laud, who had long been a prisoner in the Tower, and was incapable of giving offence to any.

136
Execution
of Laud.

137
Exploits of
the earl of
Montrose in
Scotland.

While the king's affairs thus went to decay in England, they seemed to revive a little in Scotland, thro' the conduct and valour of the earl of Montrose, a young nobleman newly returned from his travels. He had been introduced to the king; but, not meeting with an agreeable reception, had gone over to the covenanted, and been active in forwarding all their violence. Being commissioned, however, by the *tables*, to wait upon the king while the army lay at Berwick, he was so gained by the civilities and caresses of that monarch, that he thenceforth devoted himself entirely, though secretly, to his service. For attempting to form an association in favour of the royal cause, Montrose was quickly thrown into prison; but being again released, he found the king ready to give ear to his counsels, which were of the boldest and most daring kind. Though the whole nation of Scotland was occupied by the covenanted, though great armies were kept on foot by them, and every place guarded by a vigilant administration, he undertook by his own credit, and that of the few friends who remained to the king, to raise such commotions, as would soon oblige those malcontents to recal the forces which had so sensibly thrown the balance in the favours of parliament. The defeat at Marston-moor had left him no hopes of any succours from England; he was therefore obliged to stipulate with the earl of Antrim, a nobleman of Ireland, for some supply of men from that country. And he himself having used various disguises, and passed through many dangers, arrived in Scotland, where he lay for some time concealed in the borders of the Highlands.

The Irish did not exceed 1100 foot, very ill armed. Montrose immediately put himself at their head; and, being joined by 1300 Highlanders, attacked lord Elcho, who lay at Perth with 6000 men, utterly defeated him, and killed 2000 of the covenanted. He next marched northwards, in order to rouse against the marquis of Huntly and the Gordons, who had taken arms before, but been suppressed by the covenanted. At Aberdeen he attacked and entirely defeated lord Burley, who commanded 2500 men. Montrose, however, by this victory, did not obtain the end he proposed; the marquis of Huntly shewed no inclination to join an army where he was so much eclipsed by the general.

Montrose was now in a very dangerous situation. Argyle, reinforced by the earl of Lothian, was behind him with a great army. The militia of the northern counties, Murray, Ross, and Caithness, to the number of 5000, opposed him in front, and guarded the banks of the Spey, a deep and rapid river. In order

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to save his troops, he turned aside into the hills; and after some marches and countermarches, Argyle came up with him at Faivy cattle; and here after some skirmishes, in which he was always victorious, Montrose got clear of a superior army, and by a quick march through these almost inaccessible mountains put himself absolutely beyond their power.

It was the misfortune of this general, that very good or very ill fortune were equally destructive of his army. After every victory his Scots soldiers went home to enjoy the spoil they had acquired; and had his army been composed of these only, he must have soon been abandoned altogether; but his Irishmen having no place to which they could retire, adhered to him in every fortune. With these, therefore, and some reinforcements of the Atholmen and Macdonalds, Montrose fell suddenly upon Argyle's country, letting loose upon it all the horrors of war. Argyle, collecting 3000 men, marched in quest of the enemy, who had retired with their plunder; and he lay at Innerlochy, supposing himself to be still at a good distance from them. The earl of Scaforth, at the head of the garrison of Inverness, and a body of 5000 new-leived troops, pressed the royalists on the other side, and threatened them with total destruction. By a quick and unexpected march, Montrose hastened to Innerlochy, and presented himself in order of battle before the covenanted. Argyle alone, seized with a panic, deserted his army. They made a vigorous resistance, however; but were at last defeated and pursued with great slaughter: after which, Montrose was joined by great numbers of Highlanders; Scaforth's army dispersed of itself; and the lord Gordon, eldest son to the marquis of Huntly, having escaped from his uncle Argyle, who had hitherto detained him, now joined Montrose with a considerable number of his followers, attended by the earl of Aboyne.

The council at Edinburgh, alarmed at these victories, sent for Baillie, an officer of reputation, from England; and, joining him in command with Urrey, sent them with a considerable army against the royalists. Montrose, with a detachment of 800 men, had attacked Dundee, a town extremely attached to the covenant; and having carried it by assault, had given it up to be plundered by his soldiers; when Baillie and Urrey with their whole force came upon him. He instantly called off his soldiers from the plunder; put them in order; secured his retreat by the most skilful measures; and having marched 60 miles in the face of an enemy much superior, without stopping, or allowing his soldiers the least sleep or refreshment, at last secured himself in the mountains. His antagonists now divided their forces, in order to carry on the war against an enemy who surprised them as much by the rapidity of his marches as by the boldness of his enterprises. Urrey met him with 4000 men, at Alderne near Inverness; and trusting to his superiority in numbers (for Montrose had only 2000 men), attacked him in the post which he had chosen. Montrose, having placed his right wing in strong ground, drew the belt of his forces to the other, and left no main body between them; a defect which he artfully concealed by shewing a few men through trees and bushes with which that ground was covered. That Urrey might have no leisure to perceive the stratagem, he instantly led his wing to the charge, made a furious attack on the covenanted, drove

138
He defeats
two armies,
each double
in number
to his own.

8 R

them

them off the field, and obtained a complete victory over them. Baillie now advanced, in order to revenge Urrey's defeat; but he himself met with a like fate at Alford. Montrose, weak in cavalry, lined his troops of horse with infantry; and, after putting the enemy's horse to rout, fell with united force upon their foot, which were entirely cut in pieces, though with the loss of the gallant lord Gordon on the part of the royalists. — Having thus prevailed in so many battles, which his vigour always rendered as decisive as they were successful, he prepared for marching into the southern provinces, in order to put a total period to the power of the covenanters, and dissipate the parliament, which with great pomp and solemnity they had ordered to meet at St Johnstone's.

1420
Parliamentary army
new model
led.

While Montrose was thus signaling his valour in the north, Fairfax, or rather Oliver Cromwell under his name, employed himself in bringing in a *new model* into the parliamentary army, and throwing the whole troops into a different shape; and never more was a more singular army established, than that which was now set on foot by the parliament. To the greatest number of the regiments chaplains were not appointed. The officers assumed the spiritual duty, and united it with their military functions. During the intervals of action they occupied themselves in sermons, prayers, and exhortations. Rapturous ecstasies supplied the place of study and reflection; and while the zealous devotees poured out their thoughts in unpremeditated harangues, they mistook that eloquence, which to their own surprise, as well as that of others, flowed in upon them, for divine illuminations, and illapses of the Holy Spirit. Wherever they were quartered, they excluded the minister from his pulpit; and, usurping his place, conveyed their sentiments to the audience with all the authority that followed their power, their valour, and their military exploits, united to their apparent zeal and fervour. The private soldiers were seized with the same spirit; and in short, such an enthusiasm seized the whole army as was perhaps scarce ever equalled.

The royalists ridiculed this fanaticism of the parliamentary armies, without being sensible how much reason they had to dread it. They were at this time equal, if not superior, in numbers to their enemies; but so licentious, that they were become more formidable to their friends than their enemies. The commanders were most of them men of dissolute characters; in the west especially, where Goring commanded, universal spoil and havoc were committed; and the whole country was laid waste by the rapine of the army; so that the most devoted friends both to the church and state wished there for such success to the parliamentary forces as might put an end to these disorders.

1420
Royalists
defeated at
Naseby.

The natural consequence of such enthusiasm in the parliamentary army, and licentiousness in that of the king, was, that equal numbers of the latter would no longer maintain their ground against the former. This appeared in the decisive battle of Naseby, where the forces were nearly equal; but after an oblique engagement, Charles was entirely defeated, 500 of his officers and 4000 private men made prisoners, all his artillery and ammunition taken, and his infantry totally dispersed; so that scarce any victory could be more complete.

After this fatal battle, the king retired first to Here-

ford, then to Abergavenny; and remained some time in Wales, from the vain hope of raising a body of infantry in these quarters already harried and exhausted. His affairs now, however, went to ruin in all quarters. Fairfax retook Leicester on the 17th of June. On the 10th of July, he raised the siege of Taunton; and the royalists retired to Lampert, an open town in the county of Somerset. Here they were attacked by Fairfax, and beat from their post, with the loss of 300 killed and 1400 taken prisoners. This was followed by the loss of Bridgewater, which Fairfax took three days after; making the garrison, to the number of 2600 men, prisoners of war. He then reduced Bath and Sharburn; and on the 11th of September Bristol was surrendered to him by prince Rupert, though a few days before he had boasted in a letter to Charles, that he would defend the place for four months. This so enraged the king, that he immediately recalled all the prince's commissions, and sent him a pass to go beyond sea.

1421
Bristol taken.

The Scots in the mean time, having made themselves masters of Carlisle after an obstinate siege, marched southwards and invested Hereford; but were obliged to raise the siege on the king's approach. And this was the last glimpse of success that attended his arms. Having marched to the relief of Chester, which was anew besieged by the parliamentary forces under colonel Jones, his rear was attacked by Pointz, and an engagement immediately ensued. While the fight was continued with great obstinacy, and victory seemed to incline to the royalists, Jones fell upon them from the other side, and defeated them with the loss of 600 killed and 1000 taken prisoners. The king with the remains of his army fled to Newark; and from thence escaped to Oxford, where he shut himself up during the winter season.

1422
Charles retires to Oxford.

After the surrender of Bristol, Fairfax and Cromwell, having divided their forces, the former marched westwards in order to complete the conquest of Devonshire and Cornwall; the latter attacked the king's garrison which lay the east of Bristol. Nothing was able to stand before these victorious generals; every town was obliged to submit, and every body of troops that pretended to resist were utterly defeated. At last, news arrived, that Montrose himself, after some more successes, was defeated; and thus the only hope of the royal party was destroyed.

When that brave general descended into the southern counties, the covenanters, assembling their whole force, met him with a numerous army, and gave him battle at Kilsyth. Here he obtained his most memorable victory: 6000 of the covenanters were killed on the spot, and no remains of an army left them in Scotland. Many noblemen, who secretly favoured the royal cause, now declared openly for it, when they saw a force able to support them. The marquis of Douglas, the earls of Annandale and Hartfield, the lords Fleming, Seton, Maderty, Carnegie, with many others, flocked to the royal standard. Edinburgh opened its gates, and gave liberty to all the prisoners there detained by the covenanters. Among the rest was lord Ogilvy, son to Airly, whose family had contributed very much to the victory gained at Kilsyth.—David Leslie was detached from the army in England, and marched to the relief of his distressed party in Scotland. Montrose advanced

1423
Montrose defeated.

ced

ced still further to the south, allured by the vain hopes, both of rousing to arms the earls of Hume, Traquair, and Roxborough, who had promised to join him; and of obtaining from England some supply of cavalry, in which he was very deficient. By the negligence of his scouts, Lesly, at Philiphaugh in the forest, surprized his army, much diminished in numbers from the desertion of the Highlanders, who had retired to the hills, according to custom, to secure their plunder. After a sharp conflict, in which Montrose exerted great valour, his forces were routed by Lesly's cavalry, and he himself forced to fly to the mountains.

Nothing could be more affecting than the situation in which the king now was. He now resolved to grant the parliament their own terms, and sent them repeated messages to this purpose, but they never deigned to make him the least reply. At last, after reproaching him with the blood spilt during the war, they told him that they were preparing some bills, to which, if he would consent, they would then be able to judge of his pacific inclinations. Fairfax, in the mean time, was advancing with a victorious army in order to lay siege to Oxford; and Charles, rather than submit to be taken captive and led in triumph by his insolent subjects, resolved to give himself up to the Scots, who had never testified such implacable animosity against him, and to trust to their loyalty for the rest. After passing through many bye-ways and cross-roads, he arrived in company with only two persons, Dr Hudson and Mr Alburnham, at the Scots camp before Newark, and discovered himself to lord Leven their general.

The reception he met with was such as might be expected from these infatuated bigots, destitute of every principle of reason, honour, or humanity. Instead of endeavouring to alleviate the distresses of their sovereign, they suffered him to be insulted by the clergymen. They immediately sent an account of his arrival to the English parliament, and they as quickly entered into a treaty with the Scots about delivering up their prisoner. The Scots thought this a proper time for the recovery of their arrears due to them by the English. A great deal was really due them, and they claimed much more than actually belonged to them. At last, after various debates between them and the parliament, in which they pretended to great honour, and insisted upon many punctilios, it was agreed, that, upon payment of 400,000*l.* the Scots should deliver up the king to his enemies; and this was cheerfully complied with. Thus the Scots justly fell under the censure of having sold their king who had thrown himself upon their mercy; a stain peculiar to the nation, and unparalleled in history either ancient or modern. It must, however, be acknowledged, that the infamy of this bargain had such an influence on the Scots parliament, that they once voted that the king should be protected, and his liberty insisted on. But the general assembly interposed; and pronounced, that as he had refused to take the covenant which was pressed on him, it became not the godly to concern themselves about his fortunes. In consequence of this, the parliament were obliged to retract their vote. The king, being delivered over to the English commissioners, was conducted under a guard to Holdenby in the county of Northampton, where he was very rigorously confined; his ancient servants being dismissed, himself debarred from visits, and all communication cut off with his

friends or family.

The civil war being now over, the king absolved his followers from their allegiance, and the parliament had now no enemy to fear but their own troops. From this quarter their danger only arose; and it was not long before they found themselves in the same unfortunate situation to which they had reduced the king. The majority of the house were presbyterians, but the majority of the army were independents. The former, soon after the retreat of the Scots, seeing every thing reduced to obedience, proposed to disband a considerable part of the army, and send the rest over to Ireland. This was by no means relished, and Cromwell took care to heighten the disaffection. Instead of preparing to disband, therefore, the soldiers resolved to petition; and they began by desiring an indemnity, ratified by the king, for any illegal actions which they might have committed during the war. The commons voted that this petition tended to introduce mutiny, &c. and threatened to proceed against the promoters of it as enemies to the state and disturbers of the public peace. The army now began to set up for themselves. In opposition to the parliament at Westminster, a military parliament was formed. The principal officers formed a council to represent the body of peers; the soldiers collected two men out of each company to represent the commons, and these were called the *agitators of the army*; and of this assembly Cromwell took care to be a member. The new parliament soon found many grievances to be redressed; and specified some of the most considerable. The commons were obliged to yield to every request, and the demands of the agitators rose in proportion. The commons accused the army of mutiny and sedition; the army retorted the charge, and alleged that the king had been deposed only to make way for their usurpations. Cromwell, in the mean time, who secretly conducted all the measures of the army, while he exclaimed against their violence, resolved to seize the king's person. Accordingly a party of 500 horse appeared at Holmby castle, under the command of one Joyce, originally a taylor, but now a cornet; and by this man was the king conducted to the army, who were hastening to their rendezvous at Triplo-heath near Cambridge. Next day Cromwell arrived among them, where he was received with acclamations of joy, and immediately invested with the supreme command.

The commons now saw the designs of the army; but it was too late, all resistance was become vain: Cromwell advanced with precipitation, and was in a few days at St Albans. Even submission was now to no purpose; the army still rose in their demands, in proportion as these demands were gratified, till at last they claimed a right of modelling the whole government, and settling the nation.

Cromwell began with accusing eleven members of the house, the very leaders of the presbyterian party, as guilty of high treason, and being enemies of the army. The commons were willing to protect them; but the army insisting on their dismissal, they voluntarily left the house. At last the citizens of London, finding the constitution totally overturned, and a military despotism beginning to take place, instead of the kindly one they were formerly afraid of, began to think seriously of repressing the insolence of the troops. The common council assembled the militia of the city; the works were

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The army
begin to u-
surp the so-
vereign
power.

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A military
parliament
formed.

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Cromwell
seizes the
king.

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Lesly fur-
nishes fur-
nishes to
the Scots.

145
Who fell
him to the
English.

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manned; and a manifesto published, aggravating the hostile intentions of the army. Finding that the commons, in compliance with the request of the army, had voted that the city-militia should be disbanded, the multitude rose, besieged the door of the house, and obliged them to reverie that vote they had so lately passed. The assembly was, of consequence, divided into two parties; the greater part siding with the citizens; but the minority, with the two speakers at their head, were for encouraging the army. Accordingly the two speakers, with 62 of the members, secretly retired from the house, and threw themselves under the protection of the army who were then at Hounslow-heath. They were received with shouts and acclamations; their integrity was extolled; and the whole force of the soldiery, to the number of 20,000 men, now moved forward to reinstate them in their places.

In the mean time, the part of the house which was left, refused to resist the encroachments of the army. They chose new speakers, gave orders for enlisting troops, ordered the train-bands to man the lines; and the whole city boldly resolved to resist the invasion. But this resolution only held while the enemy was at a distance; for when Cromwell appeared, all was obedience and submission: the gates were opened to the general, who attended the two speakers and the rest of the members peaceably to their habitations. The eleven impeached members being accused as causes of the tumult, were expelled; and most of them retired to the continent. The mayor, sheriff, and three aldermen, were sent to the tower; several citizens, and officers of the militia, were committed to prison; and, the lines about the city levelled with the ground. The command of the Tower was given to Fairfax, the general; and the parliament ordered him their hearty thanks for disobeying their commands.

It now only remained to dispose of the king, who remained a prisoner at Hampton-court. The independent army, at the head of whom was Cromwell, on one hand; and the presbyterians, in name of both houses, on the other; treated with him separately in private. He had sometimes even hopes, that, in these struggles for power, he might have been chosen mediator in the dispute; and he expected that the kingdom at last, being sensible of the miseries of anarchy, would of its own accord be hushed into its former tranquil condition. At this time he was treated with some flattering marks of distinction; he was permitted to converse with his old servants; his chaplains were admitted to attend him, and celebrate divine service their own way. But the most exquisite pleasure he enjoyed was in the company of his children; with whom he had several interviews. The meeting on these occasions was so pathetic, that Cromwell himself, who was once present, could not help being moved, and was heard to declare, that he never beheld such an affecting scene before. But these instances of respect were of no long continuance. As soon as the army had gained a complete victory over the house of commons, the king was treated not only with the greatest disrespect, but even kept in continual alarms for his own personal safety. The consequence of this was, that Charles at last resolved to withdraw himself from the kingdom. Accordingly, on the 11th of November 1647, attended only by Sir John Berkeley, Ashburnham, and Leg, he privately left Hamp-

ton court; and his escape was not discovered till near an hour after; when those who entered his chamber, found on the table some letters directed to the parliament, to the general, and to the officer who had attended him. All night he travelled thro' the forest, and arrived next day at Titchfield, a seat of the earl of Southampton, where resided the countess dowager, a woman of honour, to whom the king knew he might safely entrust his person. Before he arrived at this place, he had gone to the sea coast: and expressed great anxiety that a ship which he seemed to look for, had not arrived. He could not hope to remain long concealed at Titchfield: the question was, what measure should next be embraced? In the neighbourhood lay the Isle of Wight, of which Hammond was governor. This man was entirely dependent on Cromwell, which was a very unfavourable circumstance: yet because the governor was nephew to Dr Hammond the king's favourite chaplain, and had acquired a good reputation in the army, it was thought proper to have recourse to him in the present exigence, when no other rational expedient could be thought of. Ashburnham and Berkeley were dispatched to the island. They had orders not to inform Hammond of the place where the king lay concealed, till they had first obtained a promise of him not to deliver up his majesty, even though the parliament and army should require him; but restore him to his liberty, if he could not protect him. The promise would have been but a very slender security: yet even without exacting it, Ashburnham imprudently, if not treacherously, brought Hammond to Titchfield; and the king was obliged to put himself into his hands, and to attend him to Carisbrooke castle in the isle of Wight, where, though he was received with great demonstrations of respect and kindness, he was in reality a prisoner.

While the king continued in this forlorn situation, Cromwell found himself upon the point of losing all the fruits of his former schemes, by having his own principles turned against himself. Among the Independents, who in general were for no ecclesiastical subordination, a set of men grew up called *levellers*, who disallowed all subordination whatsoever, and declared that they would have no other chaplain, king, or general, but Jesus Christ. Though this would have gone down very well with Cromwell as long as it was only directed against his enemies, he did not so well relish it when applied to himself. Having intimation that the levellers were to meet at a certain place, he unexpectedly appeared before them at the head of his red regiment, which had hitherto been deemed invincible. He demanded, in the name of God, what these meetings and murmurings meant; he expostulated with them upon the danger and consequence of their precipitant schemes, and desired them immediately to depart. Instead of obeying, however, they returned an insolent answer; wherefore, rushing on them in a fury, he laid two of them dead at his feet. His guards dispersing the rest, he caused several of them to be hanged upon the spot, and sent others to London; and thus diffipated a faction no otherwise criminal than in having followed his own example.

Cromwell's authority was greatly increased by the last mentioned action; but it became irresistible in consequence of a new and unexpected addition to his successes. The Scots, perhaps ashamed of the reproach

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152
He is seized
and confined
in the
isle of
Wight.

153
Cromwell in
danger from
the level-
lers.

154
He defeats
the Scots.

of

149
Sixty-two
members of
parliament
join the
army.

150
The rest
submit.

151
Charles re-
solves to
leave the
kingdom.

Britain.

of having fold their king, and stimulated farther by the Independents, who took all occasions to mortify them, raised an army in his favour, and the chief command was given to the earl of Hamilton; while Langdale, who professed himself at the head of the more bigotted party who had taken the covenant, marched at the head of his separate body, and both invaded the north of England. Though these two armies amounted to above 20,000 men, yet Cromwell, at the head of 8000 of his hardy veterans, feared not to give them battle. He attacked them one after another; routed and dispersed them; took Hamilton prisoner; and, following his blow, entered Scotland, the government of which he settled entirely to his satisfaction. An insurrection in Kent was quelled by Fairfax with the same ease; and nothing but success attended all this usurper's attempts.

155
Negotiation
between the
king and
parliament.

During these contentions, the king, who was kept a prisoner at Carisbrook castle, continued to negotiate with the parliament for settling the unspeakable calamities of the kingdom. The parliament now saw no other method of destroying the military power, but to deprecate it by the king. Frequent proposals for an accommodation passed between the captive king and the commons; but the great obstacle which had all along stood in the way, still kept them from agreeing. This was the king's refusing to abolish episcopacy, tho' he consented to alter the liturgy. However, the treaty was still carried on with vigour, and the parliament for the first time seemed in earnest to conclude their negotiations. But all was now too late. The victorious army, with Cromwell at their head, advanced to Windsor, and with furious remonstrances began to demand vengeance on the king. The unhappy monarch had been lately sent under confinement to that place; and from thence he was now conveyed to Hurst-castle in Hampshire, opposite to the Isle of Wight. The parliament in the mean time began to issue ordinances for a more effectual opposition to these military encroachments, when they were astonished by a message from Cromwell, that he intended paying them a visit next day with his whole army; and in the mean time ordering them to raise him 40,000*l.* on the city of London.

The commons, though destitute of all hopes of prevailing, had still the courage to resist, and to attempt in the face of the whole army to finish the treaty they had begun with the king. They had taken into consideration the whole of his concessions; and though they had formerly voted them unsatisfactory, they now renewed the consultation with great vigour. After a violent debate which lasted three days, it was carried in the king's favour by a majority of 129 against 83, that his concessions were a foundation for the houses to proceed upon in settling the affairs of the nation. This was the last attempt in his favour; for the next day colonel Pride, at the head of two regiments, blockaded the house; and seizing in the passage 41 members of the presbyterian party, sent them to a low room belonging to the house, that passed by the denomination of *Hell*. Above 160 members more were excluded; and none were allowed to enter but the most furious and determined of the Independents, in all not exceeding 60. This atrocious invasion of parliamentary rights commonly passed by the name of *Pride's purge*, and the remaining members were called the *Rump*. These

soon voted, that the transactions of the house a few days before were entirely illegal, and that their general's conduct was just and necessary.

Nothing now remained, to complete the wickedness of this parliament, but to murder the king. In this assembly, therefore, composed of the most obscure citizens, and officers of the army, a committee was appointed to bring in a charge against the king; and on their report, a vote passed declaring it treason in a king to levy war against his parliament. It was therefore resolved, that an high court of justice should be appointed, to try his majesty for this new invented treason. For form's sake, they desired the concurrence of the few remaining lords in the upper house; but there was virtue enough left in that body unanimously to reject the proposal. The commons, however, were not to be stopped by so small an obstacle. They voted that the concurrence of the house of lords was unnecessary, and that the people were the origin of all just power. To add to their zeal, a woman of Herefordshire, illuminated by prophetic visions, desired admittance, and communicated a revelation she pretended to have received from heaven. She assured them that their measures were consecrated from above, and ratified by the sanction of the Holy Ghost. This intelligence gave them great comfort, and much confirmed them in their present resolutions.

Colonel Harrison, the son of a butcher, was commanded to conduct the king from Hurst-castle to Windsor, and from thence to London. His afflicted subjects, who ran to have a sight of their sovereign, were greatly affected at the change that appeared in his face and person. He had permitted his beard to grow; his hair was become venerably grey, rather by the pressure of anxiety than the hand of time; while the rest of his apparel bore the marks of misfortune and decay. He had long been attended by an old decrepit servant whose name was *Sir Philip Warwick*, who could only deplore his master's fate without being able to revenge his cause. All the exterior symbols of sovereignty were now withdrawn, and his attendants had orders to serve him without ceremony. He could not, however, be persuaded that his adversaries would bring him to a formal trial; but he every moment expected to be dispatched by private assassination.

From the 6th to the 20th of January was spent in making preparations for this extraordinary trial. The court of justice consisted of 133 persons named by the commons; but of these never above 70 met upon the trial. The members were chiefly composed of the principal officers of the army, most of them of very mean birth, together with some of the lower house, and a few citizens of London. Bradshaw a lawyer was chosen president; Coke was appointed solicitor for the people of England; Dorilaus, Steele, and Alske, were named assistants. The court sat in Westminster-hall. When the king was brought forward before the court, he was conducted by the mace-bearer to a chair placed within the bar. Though long detained a prisoner, and now produced as a criminal, he still maintained the dignity of a king. His charge was then read by the solicitor, accusing him of having been the cause of all the bloodshed which followed since the commencement of the war; after which Bradshaw directed his discourse to him, and told him that the court expected his answer.

The

Britain.

157
Charge a-
gainst the
king
brought in.

158
His trial.

156
Colonel
Pride's
purge.

The king began his defence with declining the authority of the court. He represented, that having been engaged in treaty with his two houses of parliament, and having finished almost every article, he expected a different treatment from what he had now received. He perceived, he said, no appearance of an upper house, which was necessary to constitute a just tribunal. He alleged that he was himself the king and fountain of law, and consequently could not be tried by laws to which he had never given his assent; that having been intrusted with the liberties of the people, he would not now betray them by recognizing a power founded in usurpation; that he was willing, before a proper tribunal, to enter into the particulars of his defence; but that before them he must decline any apology for his innocence, lest he should be considered as the betrayer of, and not a martyr for, the constitution. Bradshaw, in order to support the authority of the court, insisted, that they had received their authority from the people, the source of all right. He pressed the king not to decline the authority of the court that was delegated by the commons of England, and interrupted and over-ruled him in his attempts to reply. In this manner the king was three times produced before the court, and as often persisted in declining its jurisdiction. The fourth and last time he was brought before this self-created tribunal, as he was proceeding thither, he was insulted by the soldiers and the mob, who cried out, "Justice! justice! Execution! execution!" but he continued undaunted. His judges having now examined some witnesses, by whom it was proved that the king had appeared in arms against the forces commissioned by parliament, they pronounced sentence against him. He seemed very anxious at this time to be admitted to a conference with the two houses, and it was supposed that he intended to resign the crown to his son; but the court refused compliance, and considered his request as an artifice to delay justice.

559
He is insulted by the soldiers.

The behaviour of Charles under all these instances of low-bred malice was great, firm, and equal. In going through the hall from this execrable tribunal, the soldiers and rabble were again incited to cry out, justice and execution! They reviled him with the most bitter reproaches. Among other insults, one insensate presumed to spit in the face of his sovereign. He patiently bore their insolence: "Poor souls (cried he), they would treat their generals in the same manner for sixpence." Those of the populace who still retained the feelings of humanity expressed their sorrow in sighs and tears. A soldier more compassionate than the rest could not help imploring a blessing on his royal head. An officer overhearing him, struck the honest centinel to the ground before the king; who could not help saying, that the punishment exceeded the offence.

At his return to Whitehall, Charles desired permission of the house to see his children, and to be attended in his private devotions by Dr Juxon late bishop of London. These requests were granted, and also three days to prepare for execution. Every night between his sentence and execution, the king slept found as usual, though the noise of the workmen employed in framing the scaffold continually resounded in his ears. The fatal morning being at last arrived, he rose early; and calling one of his attendants, he bade him employ more

560
His execution.

than usual care in dressing him, and preparing him for so great a solemnity. The street before Whitehall was the place defined for his execution; for it was intended that this should increase the severity of his punishment. He was led through the banqueting-house to the scaffold adjoining to that edifice, attended by his friend and servant bishop Juxon, a man of the same mild and steady virtues with his master. The scaffold, which was covered with black, was guarded by a regiment of soldiers under the command of colonel Tomlinson; and on it were to be seen the block, the ax, and two executioners in masks. The people, in crowds, stood at a greater distance. The king surveyed all these solemn preparations with calm composure; and, as he could not expect to be heard by the people at a distance, he addressed himself to the few persons who stood round him. He there justified his own innocence in the late fatal wars: he observed, that he had not taken arms till after the parliament had shewn him the example; and that he had no other object in his warlike preparations, than to preserve that authority entire which had been transmitted to him by his ancestors. But, though innocent towards his people, he acknowledged the equity of his execution in the eyes of his Maker: he owned that he was justly punished for having consented to the execution of an unjust sentence against the earl of Straford. He forgave all his enemies; exhorted the people to return to their obedience, and acknowledge his son as his successor; and signified his attachment to the Protestant religion as professed by the church of England. So strong was the impression made by his dying words on those who could hear him, that colonel Tomlinson himself, to whose care he had been committed, acknowledged himself a convert. At one blow his head was severed from his body. The other executioner then, holding up the head, exclaimed, "This is the head of a traitor."

It is impossible to describe the grief, indignation, and astonishment, which took place, not only among the spectators, who were overwhelmed with a flood of sorrow, but throughout the whole nation, as soon as the report of this fatal execution was conveyed to them. Each blamed himself either with active disloyalty to the king, or a passive compliance with his destroyers. The very pulpits that used to resound with insolence and sedition were now bedewed with tears of unfeigned repentance; and all united in their detestation of those dark hypocrites who, to satisfy their own enmity, involved a whole nation in the guilt of treason.—Charles was executed on the 30th of January 1649, in the 49th year of his age, and 24th of his reign. He was of a middling stature, robust, and well-proportioned. His visage was pleasant, but melancholy; and it is probable that the continual troubles in which he was involved might have made that impression on his countenance.

It being remarked, that the king, the moment before he stretched out his neck to the executioner, had said to Juxon, with a very earnest accent, the single word REMEMBER; great mysteries were supposed to be concealed under that word; and the generals vehemently insisted with the prelate that he should inform them of the king's meaning. Juxon told them, that the king, having frequently charged him to inculcate on his son the forgiveness of his murderers, had taken this opportunity in the last moment of his life, when his commands,

561
Grief of the nation on that account.

562
Pleth of the king in his last moments.

Britain.

commands, he supposed, would be regarded as sacred and inviolable, to reiterate that desire; and that his mild spirit thus terminated its present course by an act of benevolence to his greatest enemies.

163
Dissolution
the Eng-
lish monar-
chy.

The dissolution of the monarchy in England soon followed the death of the monarch. When the peers met on the day appointed in their adjournment, they entered upon business; and sent down some votes to the commons, of which the latter designed not to take the least notice. In a few days after, the commons voted, that the house of lords was useless and dangerous; for which reason it was abolished. They voted it high treason to acknowledge Charles Stuart, son of the late king, as successor to the throne. A great seal was made: on one side of which were engraven the arms of England and Ireland, with this inscription, "The great seal of England." On the reverse was represented the house of commons sitting, with this motto: "On the first year of freedom, by God's blessing restored, 1648." The forms of all public business were changed from being transacted in the king's name, to that of the *keepers of the liberties of England*. The court of king's bench was called the court of *public bench*. Nay, so cautious on this head, it is said, were some of the republicans, that, in reciting the Lord's prayer, they would not say, "thy kingdom," but "thy commonwealth, come." The king's statue in the exchange was thrown down; and on the pedestal these words were inscribed: *Exit tyrannus, regnum ultimus*; "The tyrant is gone, the last of the kings." The commons, it is said, intended to bind the princess Elizabeth apprentice to a button-maker; the duke of Gloucester was to be taught some other mechanical employment; but the former soon died, of grief, as is supposed, for her father's tragical end; the latter was sent beyond sea by Cromwell.

The commons next proceeded to punish those who had been most remarkable for their attachment to their late sovereign. The duke of Hamilton, lord Capel, and the earl of Holland, were condemned and executed; the earl of Norwich and Sir John Owen were also condemned, and afterwards pardoned. These executions irritated the Scots: their loyalty began to return; and the insolence of the independents, with their victories, inflamed them still more. They determined, therefore, to acknowledge prince Charles for their king, but at the same time to abridge his power by every limitation which they had attempted to impose on his father.

165
Charles II.
invited into
Scotland.

Charles, after the death of his father, having passed some time at Paris, and finding no likelihood of assistance from that quarter, was glad to accept of any conditions. The Scots, however, while they were thus professing loyalty to their king, were nevertheless cruelly punishing his adherents. Among others, the brave marquis of Montrose was taken prisoner, as he endeavoured to raise the Highlanders in the royal cause; and, being brought to Edinburgh, was hanged on a gibbet 30 feet high, then quartered, and his limbs stuck up in the principal towns of the kingdom. Yet, notwithstanding all this severity, Charles ventured into Scotland, and had the mortification to enter the gate of Edinburgh where the limbs of that faithful adherent were still exposed.

166
His hard
usage there.

The young king soon found that he had only exchanged his exile for imprisonment. He was surrounded

and incessantly importuned by the fanatical clergymen, who, having brought royalty under their feet, were resolved to keep it still subservient, and to trample upon it with all the contumely of upstarts. Charles pretended to give ear to their discourses; but, however, made an attempt to escape. He was overtaken and brought back; when he owned the greatness of his fault, and testified his repentance for what he had done. Cromwell, in the mean time, who had been appointed by the parliament to command the army in Ireland, prosecuted the war in that kingdom with his usual success. He had to encounter the royalists commanded by the duke of Ormond, and the native Irish led on by O'Neal. These troops he quickly overcame; and most of the towns, intimidated by his cruelty, opened their gates at his approach. He was on the point of reducing the whole kingdom, when he was recalled by the parliament to defend his country against the Scots, who had raised a considerable army in support of the royal cause.

Britain.

167
Cromwell's
success in
Ireland.

On the return of Cromwell to England, he was chosen commander in chief of the parliamentary forces, in the room of Fairfax, who declined opposing the presbyterians. The new general immediately set forward for Scotland with an army of 16,000 men, where he was opposed by general Leslie, who formed an excellent plan for his own defence. This prudent commander, knowing his men to be inferior in valour and discipline, however superior in numbers, to those of Cromwell, kept himself carefully in his intrenchments. At last Cromwell was drawn into a very disadvantageous post near Dunbar, where his antagonist waited deliberately to take advantage of him. From this imminent danger, however, he was delivered by the madness of the Scots clergy. They, it seems, had been wrestling in prayer with the Lord night and day, and at last fancied that they had obtained the superiority. Revelations were made them, that the heretical army, together with Agag their general, would be delivered into their hand. Upon the assurances of these visions, they obliged their general to descend into the plain, and give the English battle. When Cromwell saw this mad action, he assured his followers, that the Lord had delivered them into his hands, and ordered his army to sing psalms, as if already certain of victory. The Scots, though double the number of the English, were soon put to flight, and pursued with great slaughter, while Cromwell did not lose in all above 40 men.

169
They are
defeated by
Cromwell.

After this defeat, Charles put himself at the head of the remains of his army; and thence he further strengthened by the royalists, who had been for some time excluded from his service by the covenants. He was so closely pursued by Cromwell, however, that he soon found it impossible to maintain his army. Observing, therefore, that the way was open to England, he immediately directed his march towards that country, where he expected to be reinforced by all the royalists in that part of the kingdom. In this, however, he was deceived: the English, terrified at the name of his opponent, dreaded to join him. But his mortification was greatly increased, when at Worcester he was informed, that Cromwell was marching with hasty strides from Scotland with an army of 40,000 men. This news was scarcely arrived, when Cromwell himself was there. He fell upon the town on all sides: the whole Scots army

170
Charles de-
feated at
Worcester.
was

Britain.

Britain.

171
His adven-
tures after-
wards.

was either killed or taken prisoners; and the king himself, having given many proofs of personal valour, was obliged to fly.

The young king now entered upon a scene of adventures the most romantic that can be imagined. After his hair was cut off, the better to disguise his person, he worked for some days in the habit of a peasant, cutting faggots in a wood. He next made an attempt to retire into Wales, under the conduct of one Pendrel, a poor farmer, who was sincerely attached to his cause. In this attempt, however, he was disappointed; every pass being guarded to prevent their escape. Being obliged to return, he met one colonel Careless, who had escaped the carnage at Worcester. In his company the king was obliged to climb a spreading oak; among the thick branches of which they spent the day together, while they heard the soldiers of the enemy in pursuit of them below. From thence he passed with imminent danger, feeling all the varieties of famine, fatigue, and pain, till he arrived at the house of colonel Lane, a zealous royalist in Staffordshire. There he deliberated about the means of escaping into France; and Bristol being supposed the properest port, it was resolved that he should ride thither before this gentleman's sister, on a visit to one Mrs Norton, who lived in the neighbourhood of that city. During this journey, he every day met with persons whose faces he knew, and at one time passed through a whole regiment of the enemy's army.

When they arrived at Mrs Norton's, the first person they saw was one of his own chaplains sitting at the door, and amusing himself with seeing people play at bowls. The king, after having taken proper care of his horse in the stable, was shewn to an apartment which Mrs Lane had provided for him, as it was said he had the ague. The butler, however, being sent to him with some refreshment, no sooner beheld his face, which was very pale with anxiety and fatigue, than he recollected his king and master; and, falling on his knees, while the tears streamed down his cheeks, cried out, "I am rejoiced to see your majesty." The king was alarmed; but made the butler promise that he would keep the secret from every mortal, even from his master; and the honest servant punctually obeyed him.

No ship being found that would for a month set sail from Bristol either for France or Spain, the king was obliged to go elsewhere for a passage. He therefore repaired to the house of colonel Wyndham in Dorsetshire, where he was cordially received. His mother, a venerable matron, seemed to think the end of her life nobly rewarded in having it in her power to give protection to her king. She expressed no dissatisfaction at having lost three sons and one grandchild in the defence of his cause, since he was honoured in being instrumental in his own preservation.

Pursuing from thence his journey to the sea-side, he once more had a very narrow escape at a little inn, where he set up for the night. The day had been appointed for a solemn fast; and a fanatical weaver, who had been a soldier in the parliamentary army, was preaching against the king in a little chapel fronting the house. Charles, to avoid suspicion, was himself among the audience. It happened that a smith, of the same principles with the weaver, had been examining the horses belonging to the passengers, and came to as-

sure the preacher, that he knew by the fashion of the shoes, that one of the strangers horses came from the north. The preacher immediately affirmed, that this horse could belong to no other than Charles Stuart, and instantly went with a constable to search the inn. But Charles had taken timely precautions, and left the inn before the constable's arrival.

At Shoreham, in Sussex, a vessel was at last found, in which he embarked. He was known to so many, that, if he had not set sail at that critical moment, it had been impossible for him to escape. After 41 days concealment, he arrived safely at Fescamp in Normandy. No less than 40 men and women had, at different times, been privy to his escape.

Cromwell in the mean time returned in triumph; and his first care was to deprecate the Scots, on account of their having *withstood the work of the gospel* as he called it. An act was passed for abolishing royalty in Scotland, and annexing that kingdom as a conquered province to the English commonwealth. It was empowered, however, to send some members to the English parliament. Judges were appointed to distribute justice; and the people of that country, now freed from the tyranny of the ecclesiastics, were not much dissatisfied with the government.

All parts of the British dominions being now reduced to perfect subjection to the parliament, they next resolved to chastise the Dutch, who had given but very slight causes of complaint. It happened that one Dr Dorilaus, who was of the number of the late king's judges, being sent by the parliament as their envoy to Holland, was assassinated by one of the royal party who had taken refuge there. Some time after, also, Mr St John, appointed their ambassador to that court, was insulted by the friends of the prince of Orange. These were thought sufficient reasons for a declaration of war against the Hollanders by the commonwealth of England. The parliament's chief dependence lay in the activity and courage of Blake their admiral; who, though he had not embarked in naval command till late in life, yet surpassed all that went before him in courage and dexterity. On the other side, the Dutch opposed to him their famous admiral Van Tromp, to whom their country never since produced an equal. Many were the engagements between these celebrated admirals, and various was their success. Several dreadful encounters served rather to shew the excellency of the admirals, than to determine their superiority. At last the Dutch, who felt many great disadvantages by the loss of their trade, and by the total suspension of their fisheries, were willing to treat of a peace. The parliament, however, gave but a very unfavourable answer. They studied to keep their navy on foot as long as they could; rightly judging, that, while the force of the nation was exerted by sea, it would diminish the formidable power of Cromwell by land.

This great aspirer, however, quickly perceived their designs; and therefore, secure in the attachment of the army, resolved to seize the sovereign power. He persuaded the officers to present a petition for payment of arrears, and redress of grievances. His orders were obeyed: a petition was drawn up and presented, in which the officers, after demanding their arrears, desired the parliament to consider how many years they had sat, and what pretensions they had formerly made

173
He escapes to France.

173
Cromwell treats Scotland as a conquered province.

174
War with the Dutch.

175
Cromwell resolves to seize the sovereignty.

Britain.

of their designs to new-model the house, and establish freedom on its broadest basis. They alleged, that it was now full time to give place to others; and however meritorious their actions might have been, yet the rest of the nation had more right, in their turn, to manifest their patriotism in defence of their country. The house was highly offended: they appointed a committee to prepare an act, ordaining that all persons who presented such petitions for the future should be deemed guilty of high treason. To this the officers made a very warm remonstrance, and the parliament as angry a reply. Cromwell, being informed of this altercation, started up in the utmost seeming fury, and turning to major Vernon, cried out, that "he was compelled to do a thing that made the very hair of his head stand on end." Then, hastening to the house with 300 soldiers, and with the marks of violent indignation on his countenance, he entered, took his place, and attended to the debates for some time. When the question was ready to be put, he suddenly started up, and began to load the parliament with the vilest reproaches for their tyranny, ambition, oppression, and robbery of the public. Upon which, stamping with his foot, which was the signal for the soldiers to enter, the place was immediately filled with armed men. Then, addressing himself to the members, "For shame, (said he), get you gone. Give place to honest men; to those who will more faithfully discharge their trust. You are no longer a parliament; I tell you, you are no longer a parliament; the Lord has done with you." Sir Harry Vane exclaiming against this conduct, "Sir Harry! (cries Cromwell with a loud voice), O Sir Harry Vane! The Lord deliver me from Sir Harry Vane!" Taking hold then of one of the members by his cloak, "Thou art a whoremaster," cries he; to another, "Thou art an adulterer;" to a third, "Thou art a drunkard;" to a fourth, "Thou art a glutton, &c." "It is you, (continued he to the members), that have forced me upon this. I have fought the Lord night and day, that he would rather slay me than put me upon this work." Then, pointing to the mace, "Take away that bauble," cried he: after which, turning out all the members, and clearing the hall, he ordered the doors to be locked; and putting the keys in his pocket, returned to Whitehall.

177
And chuses
another.

Thus, the whole civil and military power centered in Cromwell, who by this bold transaction became, in effect, king of Great Britain, with uncontrollable authority. Being willing, however, to amuse the people with the form of a commonwealth, he proposed to give his subjects a parliament; but such an one as should be altogether obedient to his commands. For this purpose it was decreed, that the sovereign power should be vested in 144 persons, under the denomination of a parliament; and he undertook to make the choice himself. The persons pitched upon were the lowest, meanest, and most ignorant among the citizens, and the very dregs of the fanatics. To go further than others in the absurdities of fanaticism was the chief qualification upon which each of these valued himself. Their very names, borrowed from scripture, and rendered ridiculous by their misapplication, served to shew their excess of folly. One of them particularly, who was called *Praise-God Barebone*, a canting leather-seller, gave his name to this odd assembly, and it was

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called *Barebone's parliament*. They were chiefly composed of Antinomians; a sect that, after receiving the spirit, supposed themselves incapable of error; and the fifth-monarchy-men, who every hour expected Christ's second coming on earth. They began by choosing eight of their tribe to seek the Lord in prayer, while the rest calmly sat down to deliberate upon the suppression of the clergy, the universities, and courts of justice; and instead of all this, it was their intent to substitute the law of Moses.

It was impossible such a legislature as this could stand; even the vulgar began to exclaim against it, and Cromwell himself to be ashamed of their absurdities. He had carefully chosen many persons among them who were entirely devoted to his interests, and these he commanded to dismiss the assembly. These accordingly met by concert earlier than the rest of their fraternity; and observing to each other that this parliament had sat long enough, they hastened to Cromwell, with Rouse their speaker at their head, and into his hands resigned the authority with which he had invested them. Cromwell accepted their resignation with pleasure; but being told that some of their number were refractory, he sent colonel White to clear the house of such as ventured to remain there. They had placed one Moyer in the chair by the time that the colonel had arrived; and he being asked by the colonel what they did there, Moyer replied very gravely, "That they were seeking the Lord." "Then you may go elsewhere, (cried White); for, to my certain knowledge, the Lord hath not been here these many years."

The shadow of a parliament being thus dissolved, the officers, by their own authority, declared Cromwell protector of the commonwealth of England. The mayor and aldermen were sent for to give solemnity to his appointment, and he was instituted into his new office at Whitehall, in the palace of the kings of England. He was to be addressed by the title of *Highness*; and his power was proclaimed in London, and other parts of the kingdom. It was now, indeed, in a great measure necessary that some person should take the supreme command; for affairs were brought into such a situation, by the furious animosities of the contending parties, that nothing but absolute power could prevent a renewal of former bloodshed and confusion.

The government of the kingdom was adjusted in the following manner. A council was appointed, which was not to exceed 21, nor to be under 13 persons. These were to enjoy their offices for life, or during good behaviour; and, in case of a vacancy, the remaining members named three, of whom the protector chose one. The protector was appointed the supreme magistrate of the commonwealth, with such powers as the king was possessed of. The power of the sword was vested in him jointly with the parliament when sitting, or with the council at others. He was obliged to summon a parliament once every three years, and to allow them to sit five months without adjournment. A standing army was established of 20,000 foot, and 10,000 horse; and funds were assigned for their support. The protector enjoyed his office for life; and on his death, his place was to be supplied by the council. Of all these clauses the standing army was sufficient for Cromwell's purpose; for, while possessed of that instrument, he could mould the rest of the constitution to his pleasure

Britain.

179
Who are again turned out.

179
Cromwell declared protector.

180
He settles the government.

Britain.

at any time. He chose his council from among his officers, who had been the companions of his dangers and victories, to each of whom he assigned a pension of 1000 *l.* a-year. He took care to have his troops, upon whose fidelity he depended for support, paid a month in advance; the magazines were also well provided, and the public treasure managed with frugality and care; while his activity, vigilance, and resolution, were so well exerted, that he discovered every conspiracy against his person, and every plot for an insurrection, before they took effect.

Thus Cromwell continued to govern, though without assuming the title of *king*, in as absolute a manner as the most despotic prince in Europe. As he was feared at home, so he made himself respected abroad. The Dutch, having been humbled by repeated defeats, were obliged to sue for peace. Cromwell obliged them to pay deference to the British flag. He compelled them to abandon the interests of the king, to pay 85,000 *l.* as an indemnification for former expences, and to restore to the English East India company a part of those dominions which they had been dispossessed of by the Dutch during the former reign. The ministry of France thought proper to pay deference to the imperious character of the protector; and he having lent that court a body of 6000 men to attack the Spanish dominions in the Netherlands, who obtained a signal victory, the French put Dunkirk into his hands as a reward for his attachment. By means of the celebrated admiral Blake he humbled Spain prodigiously, as also the Algerines and Tunecines. Penn and Venables, two other admirals, made an attempt on the island of Hispaniola; but failing of this, they steered to Jamaica, which was surrendered to them without a blow. Yet so little was thought of the importance of this conquest, that, on their return, the two admirals were committed to the tower, on account of the failure of the principal object of their equipment.

It is not to be supposed that a numerous standing army could be maintained, and so many foreign wars carried on, without incurring extraordinary expences. The protector's revenues were so much exhausted, that he was obliged to have recourse to methods which he probably would not have chosen, had he not been driven to them by necessity. One or two conspiracies entered into by the royalists, which were detected and punished, served him as a pretence to lay a heavy tax upon all that party, of the tenth penny on all their possessions. In order to raise this oppressive imposition, ten major-generals were instituted, who divided the whole kingdom into so many military jurisdictions. These men had power to subject whom they pleased to this tax, and to imprison such as denied their jurisdiction. Under colour of these powers they exercised the most arbitrary authority; the people had no protection against their exactions; the very mask of liberty was thrown off, and all property was at the disposal of a military tribunal. It was in vain that the nation cried out for a free parliament. Cromwell assembled one in consequence of their clamours; but as speedily dissolved it when he found it refractory to his commands. At last, as parliaments were always held in such estimation by the people, he resolved to give them one, but such as should be entirely of his own choosing, and chiefly composed of his creatures. Left any of a different com-

plexion should enter the house, guards were placed at the door, and none admitted but such as produced a warrant from his council.

The principal design of convening this assembly was, that they should offer him the crown, with the title of *king*, and all the other ensigns of royalty. His creatures, therefore, took care to insinuate the confusion there was in legal proceedings without the name of a king; that no man was acquainted with the extent or limits of the present magistrature authority, but those of a king had been well ascertained by the experience of ages. The motion was at last formally made in the house, easily carried through, and nothing was now wanting but Cromwell's own consent to have his name enrolled among the kings of England. This consent, however, he never had resolution enough to give. His doubts continued for some days; and the conference carried on with the members who made him the offer, so far as it is on his part intelligible, seems to argue that he was desirous of being compelled to accept the offer: however, the conference ended in his total refusal.

With all these proffered honours, and with all his despotic power, the situation of Cromwell was far from being enviable. Perhaps no situation, however mean, or loaded with contempt, could be more truly distressful than his, at the time the nation was loading him with congratulations and addresses. He had at last rendered himself hateful to every party, and he owed his safety to their mutual hatred and diffidence of one another. His arts of dissimulation were exhausted; none could be deceived by them; even those of his own party and principles disdaining the use to which he had converted his zeal and professions. Though the whole nation silently detested his administration, he had not been completely wretched if he could have found domestic consolation. But even his own family had embraced republican principles with so much vehemence, that they could not without indignation behold him invested with uncontrollable power; and Mrs. Claypole, his favourite daughter, upbraided him, on her death-bed, with all the crimes which led him to trample on the throne. To add to all this, not only were conspiracies formed against him, but he was at last taught upon reasoning principles, that his death was not only desirable, but his assassination would be meritorious. A book was published by colonel Titus, a man who had formerly been attached to his cause, entitled *Killing no murder*. Of all the pamphlets that appeared at that time, or perhaps of those that have since appeared, this was the most eloquent and masterly. Cromwell read it, and is said never to have smiled afterwards.

The usurper now found, that the grandeur to which he had sacrificed his former tranquillity was only an inlet to fresh inquietudes. He was haunted with perpetual fears of assassination. He wore armour under his clothes, and always kept pistols in his pockets. His aspect was clouded by a settled gloom, and he regarded every stranger with suspicion. He was always attended by a numerous guard, and travelled in a hurry. He never returned from any place by the road he went; and never slept above three nights together in the same chamber. At last he was delivered from this life of horror and anxiety by a tertian ague, of which he died September 3^d, 1658, after having usurped the go-

Britain.

195
Who offer
him the
crown.

196
Which he
refuses.

197
His misera-
ble situa-
tion.

199
And death.

vern-

191
His vigo-
rous admi-
nistration.

192
See the ar-
ticle Blake.

193
Jamaica
conquered.

194
His arbi-
trary meth-
ods of pro-
curing
money.

195
He con-
venes a par-
liament.

Britain.

189
Richard
Cromwell
protector.190
s disposed.191
Rump par-
liament re-
constituted.192
Dissolved by
the army.193
Military go-
vernment es-
tablished.194
General
Monk's
motions.195
Rump par-
liament re-
stored.

vernment nine years.

Oliver Cromwell was succeeded in his office of protector by his son Richard, who immediately called a parliament. To this assembly the army presented a remonstrance, desiring some person for their general in whom they could confide. The house voted such meetings and remonstrances unlawful: upon which the officers, surrounding Richard's house, forced him to dissolve the parliament; and soon after he signed an abdication of the government. His younger brother Henry, who had been appointed to the command in Ireland, followed Richard's example, and resigned his commission without striking a blow.

The officers, thus left at liberty, resolved to restore the *rump parliament* as it was called, consisting of that remnant of a parliament which had condemned Charles. They were no sooner reinstated in their authority, however, than they began to humble the army by cashiering some of the officers, and appointing others on whom they could have more dependence. The officers immediately resolved to dissolve the assembly. Lambert, one of the general officers, drew up a chosen body of troops; and placing them in the streets which led to Westminster-hall, when the speaker Lenthall proceeded in his carriage to the house, he ordered the horses to be turned, and very civilly conducted him home. The other members were likewise intercepted; and the army returned to their quarters to observe a solemn fast, which generally either preceded or attended their outrages. A committee was then elected, of 23 persons; of whom seven were officers. These they pretended to invest with sovereign authority; and a military government was established, which gave the nation a prospect of endless servitude and tyranny without redress.

Upon hearing that the officers had by their own authority dissolved the parliament, general Monk, who was then in Scotland with 8000 veteran troops, protested against the measure, and resolved to defend the national privileges. As soon as he put his army in motion, he found himself eagerly fought after by all parties; but so cautious was he of declaring his mind, that, till the very last, it was impossible to know which side he designed to take. A remarkable instance of this cautious behaviour was, that, when his own brother came to him with a message from lord Granville in the name of the king, he refused all conversation with him upon hearing that he had told his errand to Mr Price, the general's own chaplain, and a man of known probity and honour.

Hearing that the officers were preparing an army to oppose him, Monk amused them with negotiations; and the people, finding themselves not entirely defenceless, began to declare for a free parliament. The *Rump*, finding themselves invited also by the navy and part of the army, again ventured to resume their seats, and to thunder votes in their turn against the officers and that part of the army by which they had been ejected. Without taking any notice of Lambert, they sent orders to the troops to repair immediately to the garrisons appointed for them. The soldiers obeyed; and Lambert at last found himself deserted by his whole army. Monk in the mean time proceeded with his army to London. The gentry, on his march, flocked round him with addresses expressing their desire of a new parliament; but that general, still continuing his

inflexible taciturnity, at last came to St Alban's, within a few miles of the capital, leaving all the world in doubt as to his motives and designs. Here he sent the parliament a message, desiring them to remove such forces as remained in London to country quarters. Some of the regiments willingly obeyed this order; and such as did not, Monk turned out by force: after which he took up his quarters with his army in Westminster. The house voted him thanks for his services: he desired them to call a free parliament; and this soon inspired the citizens to refuse submission to the present government. They resolved to pay no taxes until the members formerly excluded by colonel Pride should be replaced. For this they were punished by Monk, at the desire of the parliament. He arrested 11 of the most obnoxious of the common-council; broke the gates and portcullises; and, having exposed it to the scorn and contempt of all who hated it, he returned in triumph to his quarters at Westminster. The next day, however, he made an apology for this conduct, and promised for the future to co-operate with the mayor and common-council in such schemes as they should approve.

The commons were now greatly alarmed. They tried every method to gain off the general from his new alliance. Some of them even promised to invest him with the dignity of supreme magistrate, and to support his usurpation. But Monk was too just, or too wise, to hearken to such wild proposals; he resolved to restore the secluded members, and by their means to bring about a new election.

The restoration of the expelled members was easily effected; and their number was so much superior to that of the *Rump*, that the chiefs of this last party now thought proper to withdraw in their turn. The restored members began with repealing all those orders by which they had been expelled. They renewed and enlarged the general's commission; fixed a proper stipend for the support of the fleet and army; and, having passed these votes, they dissolved themselves, and gave orders for the immediate assembling of a new parliament. Mean while, Monk new-modelled his army to the purposes he had in view. Some officers, by his direction, presented him with an address, in which they promised to obey implicitly the orders of the ensuing parliament. He approved of this engagement, which he ordered to be signed by all the different regiments; and this furnished him with a pretence for dismissing all the officers by whom it was rejected.

In the midst of these transactions, Lambert, who had been confined in the Tower, escaped from his prison, and began to raise forces; and as his activity and principles were sufficiently known, Monk took the earliest precautions to oppose his measures. He dispatched against him colonel Ingoldby, with his own regiment, before Lambert had time to assemble his dependents. That officer had taken possession of Daventry with four troops of horse; but the greater part of them joined Ingoldby; to whom he himself surrendered, not without exhibiting strong marks of pusillanimity.

All this time, Monk still persisted in his reserve; nor would he intrust his secret intentions with any person, except one Morrice, a gentleman of Devonshire. He was of a sedentary and studious disposition; and with him alone did the general deliberate on the great and dangerous enterprise of the restoration. Sir John Gran-

Britain.

196
Monk takes
up his quar-
ters at West-
minster.197
Punishes the
city of Lon-
don.198
Restores the
secluded
members of
parliament.199
New parlia-
ment assem-
bled.

Britain.

Britain.

200
Charles II.
leaves
Spain.

vile, who had a commission from the king, applied for access to the general; but he was desirous to communicate his business to Morrice. Granville refused, though twice urged, to deliver his message to any but the general himself: so that Monk now, finding he could depend on this minister's secrecy, opened to him his whole intentions; but, with his usual caution, refused to commit any thing to paper. In consequence of these, the king left the Spanish territories, where he very narrowly escaped being detained at Breda by the governor, under pretence of treating him with proper respect and formality. From thence he retired to Holland, where he resolved to wait further advice.

201
His message
to the par-
liament.

The new parliament being assembled, Sir Harbottle Grimston was chosen speaker, a man known to be a royalist in his heart. The affections of all were turned towards the king; yet such were their fears, and such dangers attended a freedom of speech, that no one dared for some days to make any mention of his name. At length Monk gave directions to Annelly, president of the council, to inform them that one Sir John Granville, a servant of the king's, had been sent over by his majesty, and was now at the door with a letter to the house of commons. This message was received with the utmost joy. Granville was called in, the letter read, and the king's proposals immediately accepted of. He offered a general amnesty to all persons whatsoever, and that without any exceptions but what should be made by parliament. He promised to indulge scrupulous consciences with liberty in matters of religion; to leave to the examination of parliament the claims of all such as possessed lands with contested titles; to confirm all these concessions by act of parliament; to satisfy the army under general Monk with respect to their arrears, and to give the same rank to his officers when they should be enlisted in the king's army.

202
He lands in
England.

In consequence of this good agreement between king and parliament, Montague the English admiral waited on his majesty to inform him that the fleet expected his orders at Scheveling. The duke of York immediately went on board, and took the command as lord high admiral. The king embarked, and landing at Dover, was received by the general, whom he tenderly embraced. He entered London in 1660, on the 29th of May, which was his birth-day; and was attended by an innumerable multitude of people, who testified their joy by the loudest acclamations.

203
His first
measures
popular.

Charles II. was 30 years of age at the time of his restoration. Being naturally of an engaging countenance, and possessed of an open and affable disposition, he was the favourite of all ranks of his subjects. They had now felt the miseries of anarchy, and in proportion to these miseries was the satisfaction they felt on the accession of their young monarch. His first measures were calculated to give universal satisfaction. He seemed desirous of losing the memory of past animosities, and of uniting every party in affection for their prince and country. He admitted into his council the most eminent men of the nation, without regard to former distinctions. The presbyterians shared this honour equally with the royalists. Calamy and Baxter, presbyterian clergymen, were even made chaplains to the king. Admiral Montague was created earl of Sandwich, and general Monk duke of Albemarle. Morrice, the general's friend, was created secretary of state. But

what gave the greatest contentment to the nation was the judicious choice which the king at first made of his principal ministers and favourites. Sir Edward Hyde, created earl of Clarendon, was prime minister and chancellor. The marquis, created duke of Ormond, was steward of the household; the earl of Southampton high-treasurer; Sir Edward Nicholas secretary of state. These men, united together in the strictest friendship, and combining in the same laudable inclinations, supported each others credit, and pursued the interests of the public.

The parliament having been summoned without the king's consent, received at first only the title of a *convention*; and it was not till after an act passed for that purpose, that they were acknowledged by the name of *parliament*. Both houses owned the guilt of the former rebellion, and gratefully received in their own name, and in that of all the subjects, his majesty's gracious pardon and indemnity. The king had before promised an indemnity to all criminals, but such as should be excepted by parliament: he now issued a proclamation, declaring, that such of the late king's judges as did not surrender themselves within 14 days should receive no pardon. Nineteen surrendered themselves; some were taken in their flight; others escaped beyond sea. The peers seemed inclined to great severity on this occasion; but were restrained by the king, who in the most earnest terms pressed the act of general indemnification.

204
Regicides
punished.

After repeated solicitations, the act of indemnity passed both houses, with the exception of those who had an immediate hand in the king's death. Even Cromwell, Ireton, and Bradshaw, though dead, were considered as proper objects of resentment: their bodies were dug from their graves; dragged to the place of execution; and, after hanging some time, buried under the gallows. Of the rest who sat in judgment on the late monarch's trial, some were dead, and some thought worthy of pardon. Ten only, out of 80, were doomed to immediate destruction; and these were enthusiasts who had all along acted from principle, and who, in the general spirit of rage excited against them, shewed a fortitude that would have done honour to a better cause.

This was all the blood that was shed at the restoration. The rest of the king's judges were reprimed, and afterwards dispersed into several prisons. The army was disbanded, that had for so many years governed the nation; prelacy, and all the ceremonies of the church of England, were restored; at the same time that the king pretended to preserve the air of moderation and neutrality. In fact, with regard to religion, Charles, in his gayer hours, was a professed deist; but in the latter part of his life he shewed an inclination to the Catholic persuasion, which he had strongly imbibed in his infancy and exile.

205
Death of the
duke of
Gloucester.

On the 13th of September this year, died the young duke of Gloucester, a prince of great hopes. The king was never so deeply affected by any incident in his life. The prince of Orange, having come to England, in order to partake of the joy attending the restoration of her family, with whom she lived in great friendship, soon after sickened and died. The queen-mother paid a visit to her son, and obtained his consent to the marriage of the prince of Orange with the duke of Orleans,

Britain.

206
Parliament
dissolved.207
General
state of the
nation during
Charles
I's reign.

leans, brother to the French king. The parliament having met on the 6th of November, and carried on business with the greatest unanimity and dispatch, were dissolved by the king on the 29th of December 1660.

During the reign of Charles II. the spirit of the people seemed to take a turn quite opposite to that in the time of Charles I. The latter found his subjects animated with a ferocious though ignorant zeal for liberty. They knew not what it was to be free, and therefore imagined that liberty consisted in throwing off entirely the royal authority. They gained their point: the unhappy monarch was dethroned and murdered; but instead of liberty, they found themselves involved in much worse tyranny than before. Being happily freed from this tyranny by the restoration, they ran into the contrary extreme; and instead of an unbounded spirit of opposition, there was nothing now to be found but as unbounded a spirit of submission; and through the slavish submissions and concessions of the people in this reign, Charles found means to render himself at last almost quite absolute, and to govern without requiring, or indeed without having any occasion for parliaments.

A like revolution took place with regard to religious matters. During the former reigns, a spirit of the most gloomy enthusiasm had overspread the whole island, and men imagined that the Deity was only to be pleased by their denying themselves every social pleasure, and refusing every thing that tended to make life agreeable. The extreme hypocrisy of Cromwell and his associates, and the absurd conduct of others, showed that this was not religion: but, in avoiding this error, they ran into one equally dangerous; and every thing religious or serious was discountenanced. Nothing but riot and dissipation took place every where. The court set them the example; nothing but scenes of gallantry and festivity were to be seen; the horrors of the late war became the subject of ridicule; the formality of the sectaries was displayed on the stage, and even laughed at from the pulpit. In short, the best mode of religion now was to have as little as possible; and to avoid not only the hypocrisy of the sectaries, but even the common duties of morality.

208
Ingratitude
of Charles.

In the midst of this riot and dissipation, the old and faithful followers of the royal family were left unrewarded. Numbers who had fought both for the king and his father, and who had lost their whole fortunes in his service, still continued to pine in want and oblivion; while in the mean time their persecutors, who had acquired fortunes during the civil war, were permitted to enjoy them without molestation. The wretched royalists petitioned and murmured in vain; the monarch fled from their expostulations to scenes of mirth and festivity; and the act of indemnity was generally said to have been an act of *forgiveness* to the king's enemies, and of *oblivion* to his friends.

209
obmissive
disposition
of both par-
liaments.

In 1661, the Scots and English parliaments seemed to vie with each other in their prostrations to the king. In England, monarchy and episcopacy were raised to the greatest splendour. The bishops were permitted to resume their seats in the house of peers; all military authority was acknowledged to be vested in the king. He was empowered to appoint commissioners for regulating corporations, and expelling such members as had intruded themselves by violence, or professed pri-

ciples dangerous to the constitution. An act of uniformity was passed, by which it was required that every clergyman should be re-ordained, if he had not before received episcopal ordination; that he should declare his assent to every thing contained in the book of Common prayer, and should take the oath of canonical obedience. In consequence of this law, above 2000 of the presbyterian clergy resigned their cures at once. In Scotland the right of the king was asserted in the fullest and most positive terms to be hereditary, divine, and indefeasible. His power was extended to the lives and possessions of his subjects, and from his original grant was said to come all that they enjoyed. They voted him an additional revenue of 40,000 *l.*; and all their former violences were treated with a degree of the utmost detestation.

Britain.

This intoxication of loyalty, however, began soon to wear off. The king's profusion and extravagance in his pleasures, together with his indolence in administration, furnished opportunities of making very disadvantageous comparisons between him and Oliver Cromwell. These animosities were heightened by the ejected clergy, especially when they saw Dunkirk, which had been acquired during the usurper's vigorous administration, sold to the French for 40,000 *l.* and that merely to supply the king's extravagance. From this time (August 17th 1662), Charles found himself perpetually opposed, and his parliaments granted supplies much more reluctantly than before.

210
The nation
disgusted
with the
king's ex-
travagance.

A few months before, the continual exigencies of the king had forced him to conclude a marriage with the Infanta of Portugal for the sake of her portion, which was 500,000 *l.* in money, together with the fortresses of Tangier in Africa, and of Bombay in the East Indies. The chancellor Clarendon, the dukes of Ormond and Southampton, urged many reasons against this match, particularly the likelihood of her never having any children; but all their objections could not prevail, and therefore Clarendon set himself to promote it as far as lay in his power. Still, however, the king's necessities were greater than his supplies. He therefore resolved to sacrifice his minister the great Clarendon to the resentment of the parliament, to whom he was become obnoxious, in order to procure some more supplies for himself. In 1663, an extraordinary supply was demanded: the king sent for the commons, on the 12th of June, to Whitehall. He complained of their inattention; and by acquainting them of a conspiracy to seize the castle of Dublin, he hoped to furnish a reason for demanding a present supply. Four subsidies were immediately granted, and the clergy in convocation followed the example of the commons. On this occasion the earl of Bristol ventured to impeach the chancellor in the house of peers; but as he did not support his charge, the affair was dropped for the present.

211
Marriage
with the in-
fanta of
Portugal.

With a view probably of having the money to be employed for that purpose in his hands, Charles was induced to declare war against the Dutch in 1664. In this war the English, under the command of Sir Robert Holmes, expelled the Dutch from Cape-Corse castle on the coast of Africa, and likewise seized on their settlements of Cape Verd and the isle of Gorre. Sailing from thence to America, the admiral possessed himself of Nova Belgia, since called *New York*; and which

212
War with
the Dutch.

Britain.

Britain.

213
Terrible
battles at
sea.

has ever since continued subject to Britain. On the other hand, De Ruyter, the Dutch admiral, dispossessed the English of all their settlements in Guinea except Cape Corfe. He afterwards sailed to America, where he attacked Barbadoes and Long Island, but was repulsed. Soon after, the two most considerable fleets of each nation met; the one under the duke of York, to the number of 114 sail; the other commanded by Opdam admiral of the Dutch navy, of nearly equal force. The engagement began at four in the morning, and both sides fought with equal intrepidity. The duke of York was in the hottest part of the engagement, and behaved with great spirit and composure, while many of his lords and attendants were killed beside him. In the heat of the action the Dutch admiral's ship blew up; which so discouraged and disheartened them, that they fled towards their own coast, having 30 ships sunk and taken, while the victors lost only one. This success of the English so much excited the jealousy of the neighbouring states, that France and Denmark immediately resolved to protect the republic from such formidable enemies. De Ruyter the great Dutch admiral on his return from Guinea was appointed, at the head of 76 sail, to join the duke of Beaufort the French admiral, who it was supposed was then entering the British channel from Toulon. The duke of Albemarle and prince Rupert now commanded the British fleet, which did not exceed 74 sail. Albemarle detached prince Rupert with 20 ships to oppose the duke of Beaufort; against which piece of rashness Sir George Ayscue protested in vain. The fleets thus engaging upon unequal terms, a most memorable battle ensued. The first day, the Dutch admiral Evertzen was killed by a cannon-ball, one of their ships was blown up, and three of the English ships taken; the combatants were parted by darkness. The second day they renewed the battle with incredible fury. Sixteen fresh ships joined the Dutch; and the English were so shattered, that their fighting ships were reduced to 28. Upon retreating towards their own coast, the Dutch followed them; where another dreadful conflict was beginning, but parted by the darkness of the night as before. The morning of the third day the English continued their retreat, and the Dutch their pursuit. Albemarle came to the desperate resolution of blowing up his own ship rather than submit to the enemy, when he found himself happily reinforced by prince Rupert with 16 ships of the line. By this time it was night; and the next day the fleets came again to a close combat, which was continued with great violence, till they were parted by a mist. Sir George Ayscue having the misfortune to strike on the Galoper sands, was taken, with a ship of 100 guns.

Both sides claimed the victory, but the Dutch certainly had the advantage in this engagement. A second, however, equally bloody, happened soon after, with larger fleets on both sides, commanded by the same admirals. In this the Dutch were vanquished; but they were soon in a condition to face their enemies, by the junction of Beaufort the French admiral. The Dutch fleet appeared in the Thames, conducted by their great admiral. The English were thrown into the utmost consternation: a chain had been drawn across the river Medway; and some fortifications had been added to the forts along the bank. But all these were

214
Dutch fleet
appears in
the Thames.

unequal to the present force: Sheerneys was soon taken; the Dutch passed forward and broke the chain, though fortified by some ships sunk by Albemarle's orders. Destroying the shipping in their passage, they still advanced, with six men of war and five fire-ships, as far as Upnore castle, where they burned three men of war. The whole city of London was in consternation; it was expected that the Dutch might fall up next tide to London-bridge, and destroy not only the shipping, but even the buildings of the metropolis. The Dutch, however, were unable to prosecute that project from the failure of the French who had promised them assistance. Spreading therefore an alarm along the coast, and having insulted Norwich, they returned to their own coasts.

During these transactions abroad, happened a great plague at London, which destroyed 100,000 of the inhabitants. This calamity was soon followed by another, still more dreadful if possible. A fire broke out in a baker's house in Pudding-lane near the bridge, and spread with such rapidity, that no efforts could extinguish it, till it laid in ashes the most considerable part of the city. This calamity, though it reduced thousands to beggary, proved in the end both beneficial and ornamental to the city. It rose from its ruins in greater beauty than ever; the streets being widened, and the houses built of brick instead of wood, became thus more wholesome and secure. In so great a calamity it is remarkable that not a single life was lost.

These complicated misfortunes did not fail to excite many murmurs among the people: The blame of the fire was laid on the Papists: the Dutch war was exclaimed against as unsuccessful and unnecessary, as being an attempt to humble that nation who were equal enemies to Popery with themselves. Charles himself also began to be sensible, that all the ends for which he had undertaken the Dutch war were likely to be entirely frustrated. Instead of being able to lay up money for himself, the supplies of parliament had hitherto been so scanty, that he found himself considerably in debt. A treaty was therefore set on foot, which was concluded at Breda on the 21st of July 1667. By this treaty the only advantage gained by Britain was, the cessation of the colony of New York. It was therefore judged disgraceful, and the blame of it thrown upon the unhappy earl of Clarendon. Along with this, he was charged with the sale of Dunkirk; the bad payment of the seamen; the disgrace by the Dutch fleet; and his own ambition. His daughter, while yet in Paris, had commenced an amour with the duke of York; and under a solemn promise of marriage had admitted him to her bed. Her lover, however, either of his own accord, or through the persuasions of his brother Charles, afterwards married her; and this too was imputed as a crime to Clarendon. On these accusations, the king, who on account of his rigid virtue had never much loved this nobleman, ordered the seals to be taken from him, and given to Sir Orlando Bridgeman. Clarendon was again impeached; and though the charges were manifestly frivolous, yet so strong was the popular torrent against him, that he thought proper to withdraw into France. Soon after, the king formed an alliance with Holland and Sweden, in order to prevent the French king from completing his conquest of the Netherlands. The greatest part of this country he had al-

215
Plague and
fire at Lon-
don.

216
Peace with
Holland
concluded.

217
Clarendon
disgraced.

218
Alliance
with Hol-
land and
Sweden.

ready

Britain. ready subdued, when he was unexpectedly stopped by this league; in which it was agreed by the contracting powers, that they would constitute themselves arbiters of the differences between France and Spain, and check the exorbitant pretensions of either.

219 The king now began to act in a very arbitrary manner. He had long wished to extend his prerogative, and to be able to furnish himself with whatever sums he might want for his pleasures, and therefore was most likely to be pleased with those ministers who could flatter both his wishes at once. These he found in Clifford, Ashley, Buckingham, Arlington, and Lauderdale, a junto distinguished by the name of the *cabal*; a word formed by the initials of their names. The first effects of their advice was a secret alliance with France, and a rupture with Holland. Soon after this, the duke of York declared himself a Papist; and liberty of conscience was proclaimed to all sectaries, whether dissenters or Papists: a proclamation was issued containing very rigorous clauses in favour of pressing; another full of menaces against those who should speak undutifully of his majesty's measures; and even against those who heard such discourses, unless they informed in due time against the offenders. All these things gave very great and just offence to the people; but they were especially alarmed at the alliance with France, and justly afraid of the treachery of that nation.

220 On the 28th of May 1672, the English fleet under the duke of York was surprised by the Dutch in South-west bay. About eight in the morning began a most furious engagement. The gallant Sandwich, who commanded the English van, drove his ship into the midst of the enemy, beat off the admiral that ventured to attack him, sunk another ship that attempted to board him, and three fire-ships that offered to grapple with him. Though his vessel was torn with shot, and out of 1000 men there only remained 400, he still continued to fight. At last, a fire-ship, more fortunate than the rest, having laid hold of his vessel, her destruction became inevitable, and the earl himself was drowned in attempting to swim to some other ship. Night parted the combatants; the Dutch retired, and were not followed by the English. The loss sustained by the two maritime powers was nearly equal; but the French suffered very little, not having entered into the heat of the engagement. It was even supposed that they had orders for this conduct, and to spare their own ships, while the Dutch and English should weaken each other by their mutual animosities.

222 The combined powers were much more successful against the Dutch by land. Lewis conquered all before him, crossed the Rhine, took all the frontier towns of the enemy, and threatened the new republic with a final dissolution. Terms were proposed to them by the two conquerors. Lewis offered them such as would have deprived them of all power of resisting an invasion from France by land. Those of Charles exposed them equally to every invasion by sea. At last the murmurs of the English at seeing this brave and industrious people, the supporters of the Protestant cause, totally sunk and on the brink of destruction, were too loud not to reach the king. He was obliged to call a parliament, to take the sense of the nation upon his conduct; and he soon saw how his subjects stood affected.

The parliament met on the 4th of February 1673.

They began with repressing some of the king's extraordinary stretches of prerogative, and taking means for uniformity in religious matters. A law was passed entitled the *test act*, imposing an oath on all who should enjoy any public benefice. Besides the taking the oaths of allegiance and the king's supremacy, they were obliged to receive the sacrament once a year in the established church, and to abjure all belief in the doctrine of transubstantiation. As the dissenters also had seconded the efforts of the commons against the king's declaration of indulgence to Roman Catholics, a bill was passed for their ease and relief, which, however, went with some difficulty through the house of peers. The Dutch in the mean time continued to defend themselves with such valour, that the commons began to despair of success. They therefore resolved that the standing army was a grievance; they next declared, that they would grant no more supplies to carry on the Dutch war, unless it appeared that the enemy were so obstinate as to refuse all reasonable conditions. To cut short these disagreeable altercations, the king resolved to prorogue the parliament; and, with that intention, went unexpectedly to the house of peers, from whence he sent the usher of the black-rod to summon the house of commons to attend. It happened that the usher and the speaker met nearly at the door of the house; but the speaker being within, some of the members suddenly shut the door, and cried "To the chair." Upon which the following motions were instantly made in a tumultuous manner: That the alliance with France was a grievance; that the evil counsellors of the king were a grievance; that the earl of Lauderdale was a grievance; and then the house rose in great confusion. The king soon saw that he could expect no supply from the commons for carrying on the war which was so disagreeable to them; he resolved, therefore, to make a separate peace with the Dutch, on terms which they had proposed by the Spanish ambassador. For form's sake, he asked the advice of his parliament; who concurring heartily in his intentions, a peace was concluded accordingly.

226 The prepossession which Charles had all along shewn for France, and his manifest inclination upon all occasions to attach himself to that kingdom, had given great offence to his people. Along with this, other circumstances conspired to raise a general discontent. The toleration of Catholics, so much wished for by the king; the bigotry of the duke of York, the heir apparent to the crown, and his zeal for the propagation of the Catholic religion; excited a consternation not altogether without foundation, as if the Protestant religion was in danger. This fear and discontent was carefully kept up and fomented by wicked and designing men, who to promote their own interests would not scruple to advance the grossest falsehoods. In 1678, an account of a plot formed by the Papists for destroying the king and the Protestant religion, was given in by one Kirby a chemist, Dr Tong, a weak credulous clergyman, and Titus Oates, who had likewise been a clergyman, but one of the most abandoned miscreants that can be imagined. The circumstances attending this pretended discovery were so perfectly incredible, that it appears amazing how any person of common sense could give ear to them. Nevertheless, so much were the minds of the nation in general inflamed against the Catholics at the

Britain.

224
Test act framed.225
Tumult in the house of commons.226
National discontents.

See Oates.

this time, that it not only produced the destruction of individuals of the Romish persuasion, but an universal massacre of that unhappy sect was apprehended. The parliament, who ought to have repressed these delusions, and brought back the people to calm deliberate inquiry, were found more credulous than even the vulgar themselves. The cry of plot was immediately echoed from one house to the other; the country party could not let slip so favourable an opportunity of managing the passions of the people; the courtiers were afraid of being thought disloyal if they should doubt the guilt of those who were accused of designs against the king's person. Danby, the prime minister, himself entered into it very furiously, and persisted in his inquiries notwithstanding all the king's advices to the contrary. Charles himself, who was the person that ought to have been most concerned, was the only one who treated it with contempt. Nothing, however, could stop the popular fury; and for a time the king was obliged to give way to it.

229
Lord Dan-
by impeach-
ed.

During the time of this general uproar and persecution, the lord treasurer Danby was impeached in the house of commons by Seymour the speaker. The principal charge against him was, his having written a letter to Montague the king's ambassador at Paris, directing him to sell the king's good offices at the treaty of Nimeguen, to the king of France, for a certain sum of money; contrary to the general interests of the confederates, and even of those of his own kingdoms. Tho' the charge was just, yet Danby had the happiness to find the king resolved to defend him. Charles assured the parliament, that, as he had acted in every thing by his orders, he held him entirely blameless; and though he would deprive him of all his employments, yet he would positively insist on his personal safety. The lords were obliged to submit; however, they went on to impeach him, and Danby was sent to the Tower, but no worse consequences followed.

These furious proceedings had been carried on by an house of commons that had continued undissolved for above 17 years. They were now dissolved, and another parliament was called; which, however, proved as unmanageable as the preceding. The members resolved to check the growth of Popery by striking at the root of the evil; and therefore brought in a bill for the total exclusion of the duke of York from the crown of England and Ireland, which passed the lower house by a majority of 79. They next voted the king's standing army and guards to be illegal. They proceeded to establish limits to the king's power of imprisoning delinquents at will. It was now also that the celebrated statute called the *habeas corpus act* was passed, which confines the subject in an absolute security from oppressive power.

228
Exclusion
bill brought
in.

During these troubles the duke of York had retired to Brussels; but an indisposition of the king led him back to England, to be ready, in case of any sinister accident, to assert his right to the throne. After prevailing upon his brother to disgrace his natural son the duke of Monmouth, who was now become very popular, he himself retired to Scotland, under pretence of quieting the apprehensions of the English nation, but in reality to strengthen his interests in that part of the empire. This secession served still more to inflame the country party, who were strongly attached to the duke of Monmouth, and were resolved to support him against

the duke of York. Mobs, petitions, pope-burnings, were artifices employed to keep up the terrors of Popery, and alarm the court. The parliament had shown favour to the various tribes of informers, and that served to increase the number of these miscreants; but plots themselves also became more numerous. Plot was set up against plot; and the people were kept suspended in the most dreadful apprehension.

But it was not by plots alone that the adverse parties endeavoured to supplant each other. Tumultuous petitions on the one hand, and flattering addresses on the other, were sent up from all quarters. Wherever the country party prevailed, petitions were sent to the king filled with grievances and apprehensions. Wherever the church or court-party prevailed, addresses were framed, containing expressions of the highest regard to his majesty, and the deepest abhorrence of those who endeavoured to disturb the public tranquillity. Thus the nation came to be distinguished into *petitioners* and *abhor- 229*
rers. *Whig* and *Tory*, also, were now first used as terms of reproach. The whigs were so denominated from a cant name given to the four presbyterian conventicles, (*whig* being *milk turned sour*). The tories were denominated from the Irish banditti so called, whose usual manner of bidding people deliver was by the Irish word *Tóree*, or "Give me."

All this time the king had tyrannized over the Scots in a very cruel manner. Being apprized of the tendency of presbyterian principles to a republican form of government, Charles, like his predecessors, had endeavoured to introduce episcopacy there, but in a much more violent manner than had been formerly attempted. The rights of patrons had for some years been abolished; and the power of electing ministers had been vested in the kirk-session and lay elders; but it was now enacted, that all incumbents who had been admitted upon this title should receive a presentation, and be instituted anew by the bishop, under the penalty of deprivation. In consequence of this, 350 parishes were at once declared vacant. New ministers were sought for all over the kingdom, and none was so vicious or ignorant as to be rejected. The people, as might have been expected, were displeased to the highest degree; they resolved, however, to give no sign of mutiny or sedition, notwithstanding their discontent. This submission made their case still worse; it being foolishly imagined, that, as they did not complain for a little ill usage, they would submit altogether if they were worse treated.

230
Attempt to
establish epi-
scopacy in
Scotland.

Affairs remained in a peaceable situation, till, in 1664, a very severe act was passed in England against conventicles; and this severity was imitated by the Scots parliament, who passed an act of the same kind. Military force was next let loose. Wherever the people had generally forsaken their churches, the guards were quartered throughout the country. They were commanded by Sir James Turner, a man of a very furious temper and dissolute life. He went about and received lists from the clergy of those who absented themselves from the churches, or were supposed to frequent conventicles. Without any proof, or legal conviction, he demanded a fine from them; and quartered soldiers on the supposed criminals till he received payment. An insurrection being dreaded during the Dutch war, new forces were levied, and entrusted to the command of Dalziel

232
Occasions
discontent.

235
Presbyterians
and persecu-
ted.

Dalziel and Drummond, two men of a very cruel disposition, and the Scots parliament gave full scope to all their enmities.

Rebolutions were now made to the king, who promised some redress. But his lenity came too late. The people, in 1668, rose in arms. They surprised Turner in Dumfries, and resolved to have put him to death; but finding his orders to have been more violent than his execution of them, they spared his life. At Lanerick they renewed the covenant, and published their manifesto; where they professed their submission to the king, and only desired the re-establishment of presbytery, and of their former ministers. Their force never exceeded 2000 men; and though the country in general bore them great favour, men's spirits were so subdued, that the insurgents could expect no further increase of numbers. Dalziel took the field to oppose them. The number of the covenanters was now reduced to 800, and these no way capable of contending with regular forces. Having advanced near Edinburgh, they attempted to find their way back into the well by Pentland-hills. Here they were attacked by the king's troops, and received the first charge very resolutely; but that was all the action. Immediately they fell into confusion, and fled. About 40 were killed on the spot, and 130 taken prisoners.

So long ago as the year 1661, the presbyterians had deputed one Sharpe to lay their grievances before the king. Instead of this, their deputy abandoned the cause altogether, became their violent enemy, and as a reward of his treachery was made archbishop of St Andrews. After the battle of Pentland-hills, this man was the foremost to take vengeance on the unhappy insurgents, whose oppressed state and inoffensive behaviour had made them objects of universal compassion. Ten were hanged on one gibbet in Edinburgh; 35 before their own doors in different places. They might all have saved their lives, if they would have renounced the covenant; but this they resolutely refused. The executions were going on, when the king wrote a letter to the privy council, in which he ordered that such of the prisoners as should simply promise to obey the laws for the future should be set at liberty, and that the incorrigible should be sent to the plantations. This letter was brought to the council by Dunnet, but was not immediately delivered by Sharpe. What his motives were for this delay, we pretend not to say; but certain it is, that no action of his life will bear a worse construction than this. It had been callousness to put these poor creatures to very severe tortures, in order to make them confess that to be false and which they believed to be true. By Sharpe's delay, one Hugh Maccaul had been tortured, who would otherwise have escaped; and so violent were the torments he endured, that he expired under them. He seemed to die in an ecstasy of joy. His last words were uttered with an accent which struck all the bystanders with astonishment. "Farewell, (said he), sun, moon, and stars; farewell world and time; farewell week, frail body; welcome eternity; welcome angels and saints; welcome Saviour of the world; and welcome God the judge of all."

In 1669, an act against conventicles was passed, seemingly with a design of mitigating the former persecuting laws; though even this was severe enough. By this act, the hearer in a conventicle; (that is, in a dis-

senting assembly where more than five beside the family were present), was fined 5s. for the first offence, and 10s. for the second; the preacher 20l. for the first offence, and 40l. for the second. The person in whose house the conventicle met was fined a like sum with the preacher. One remarkable clause was, that if any dispute should arise with regard to the interpretation of any part of the act, the judges should always explain the doubt in the sense least favourable to conventicles, it being the intention of parliament entirely to suppress them.

As the violent methods used by the king were found ineffectual to obtain his purpose in Scotland, in 1673 a scheme of compulsion was tried, by which it was proposed to diminish greatly the authority of the bishops, to abolish their negative voice in the ecclesiastical courts, and to leave them little more than the right of precedence among the presbyters; but this too was rejected by the people, who well knew its tendency. The next scheme was an indulgence. By this, the most popular of the expelled preachers, without requiring any terms of submission to the established religion, were settled in vacant churches; and small salaries of about 20l. a-year were offered to the rest, till they should be otherwise established. This bounty was rejected as the wages of criminal silence, and the replaced ministers soon repented of their compliance; conventicles multiplied, and the covenanters daily met in arms at their places of worship, though they usually dispersed themselves after divine service.

These mild methods being rejected, a renewal of the persecution commenced under the administration of the duke of Lauderdale, and in which archbishop Sharpe had a principal hand. It was an old law, and but seldom put in execution, that a man who was accused of any crime, and did not appear to take his trial, might be *intercommuned*; that is, he might be publicly outlawed; and whoever afterwards, either on account of business, relation, or charity, had the least intercourse with him, was subjected to the same penalties which the law could inflict on the criminal himself. A great many writs of intercommuning were now issued against the covenanters; by which absurd method of proceeding, crimes and punishments were multiplied to an extreme degree.

Application was made to Charles for some redress of these grievances; but he was too much taken up with his pleasures to take any effectual means of putting a stop to them; nay, even while he retracted them, he was persuaded to avow and praise them in a letter to the privy council. The consequence of all this was, that the covenanters were at last so much enraged against Sharpe, whom they considered as an apostate, and experienced to be an unrelenting persecutor, that, on the 3^d of May 1679, he was way-laid and murdered with all the circumstances of unrelenting cruelty. The murder of Sharpe produced a persecution still more violent, which at last brought on another insurrection.

The covenanters finding themselves obliged to meet in large bodies, and bring arms along with them for their own security, set forth a declaration against pre-lacy, which they published at Rutherglen, a small borough near Glasgow; and in the market-place there they burned several acts of parliament which had established that mode of ecclesiastical government, and had prohibited all conventicles. For this purpose they chose

Duties.

the 29th of May, the anniversary of the reformation; and previously extinguished the bonfires that had been kindled on that occasion. Count Graham, afterwards viscount Dundee, an active and enterprising officer, attacked a great conventicle upon Loudon-hill, but was repulsed with the loss of 30 men. The covenanters then finding themselves unwarily engaged in rebellion, were obliged to persevere; and therefore pushed on to Glasgow, which, though repulsed at first, they afterwards made themselves masters of. Here they dispossessed the established clergy, and issued proclamations in which they declared that they fought against the king's supremacy, against Popery and prelacy, and against a Popish successor.

Charles, being now alarmed, dispatched against the covenanters a small body of English cavalry under the duke of Monmouth. He joined the Scots guards, and some regiments of militia levied from the well-affected counties; and with great celerity marched in quest of the insurgents. They had taken post at Bothwell-bridge between Hamilton and Glasgow; where there was no access but by the bridge, and where a small body was able to defend it against the king's army. The whole army of the covenanters never exceeded 8000 men, and they had in reality no other generals than their clergymen. Monmouth attacked the bridge, and the covenanters maintained their post as long as their ammunition lasted. When they sent for more, they received orders to quit their post and retire; and this imprudent measure occasioned an immediate defeat. Monmouth passed the bridge without opposition, and drew up his forces opposite to the enemy. His cannon alone put them to the rout. About 700 were killed in the pursuit; for, properly speaking, there was no action. Twelve hundred were taken prisoners, and treated with humanity by Monmouth. Such as promised to live peaceably under the present government were dismissed; and about 300 who refused this condition were shipped for Barbadoes, but unfortunately perished by the way. Two of their clergymen were hanged. Soon after, an act of indemnity was passed: but Lauderdale took care that it should afford little protection to the unhappy covenanters; for though orders were given to connive thenceforward at all conventicles, he found means under a variety of pretences to elude the execution of them.

It is now certainly known, that king Charles II. had formed a scheme of overturning the established religion, and substituting Popery in its place; as also of rendering himself absolute. In this, however, he met with violent opposition from his parliament; and as this one of 1679 seemed even to surpass their predecessors in violence, the king was induced to dissolve them and call another in 1689. By this step, however, he was no gainer. They voted the legality of petitioning the king; and fell with extreme violence on the abhorrent, who in their addresses to the crown had expressed their disapprobation of those petitions. Great numbers of these were seized by their order in all parts of England, and committed to close custody: the liberty of the subject, which had been so carefully guarded by their own recent law, was every day violated by their arbitrary and capricious imprisonments. One Stowel of Exeter put a stop to their proceedings; he refused to obey the serjeant at arms who was sent to apprehend

him; he stood upon his defence, and said he knew no law by which the house of commons pretended to commit him. The house, finding it equally dangerous to proceed or recede, got off by an evasion. They voted that Stowel was indisposed; and a month's time was allowed him for his recovery. It is happy for the nation, that should the commons at any time overleap the bounds of their authority, and capriciously order men to be put in prison, there is no power, in case of resistance, that can compel the prisoner to submit to their decrees.

The chief point, however, laboured by the present parliament was, to obtain the exclusion bill, which, though the former house had voted, was never yet passed into a law. It passed by a great majority in the house of commons, but was thrown out by the house of peers. All the bishops, except three, voted against it; for they were of opinion that the church of England was in much greater danger from the prevalence of presbyterianism than Popery. The commons were extremely mortified at the rejection of their favourite bill: in revenge, they passed several other disagreeable acts, among which one was, That, till the exclusion bill was passed, they could not, consistent with the trust reposed in them, grant the king any manner of supply; and that whoever should hereafter lend, by way of advance, any money upon any branches of the king's revenue, should be responsible to parliament for his conduct. Charles, therefore, finding that there were no hopes of extorting either money or obedience from the commons, came to a resolution of once more dissolving the parliament. His usher of the black-rod accordingly came to dissolve them while they were voting that the dissenters should be encouraged, and that the Papists had burned the city of London.

It was for some time a doubt whether the king would ever call another parliament: his necessities, however, surmounted all his fears of their violence; and, in 1681, he summoned his parliament to meet him at Oxford, that he might thus have an opportunity of punishing the city of London by shewing his suspicions of their loyalty. In this, as in all former parliaments, the country party predominated; and they trode exactly in the same paths with their predecessors. The same speaker was chosen, and the exclusion bill urged more fiercely than before. Ernelly, one of the king's ministers, proposed that the duke should be banished 500 miles from England; and that, on the king's decease, the next heir should be constituted regent with regal power. Yet even this expedient, which left the duke the bare title of king, could not obtain the attention of the house. Nothing but a total exclusion could satisfy them.

Each party had now for some time reviled and ridiculed each other in pamphlets and libels; and this practice at last was attended with an incident that deserves notice. One Fitzharris, an Irish Papist, employed a Scotman named *Everhard* to write a libel against the king and the duke of York. The Scot was actually a spy for the contrary party; and supposing this a trick to entrap him, he discovered the whole to Sir William Waller, an eminent justice of the peace; and, to convince him of the truth of his information, posted the magistrate and two other persons privately, where they heard the whole conference between Fitzharris and himself. The libel composed between them was replete with

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242
Infants
defeated at
Bothwell-
bridge.

244
Parliament
dissolved.

245
New one
called at Ox-
ford.

243
Violent pro-
ceedings of
parliament.

246
Case of Fitz-
harris.

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with the utmost rancour and scurrility. Waller carried the intelligence to the king, and obtained a warrant for committing Fitzharris, who happened at that very time to have a copy of the libel in his pocket. Seeing himself in the hands of a party from whom he expected no mercy, he resolved to fide with them, and throw the odium of the libel upon the court, who, he said, were willing to draw up a libel which should be imputed to the excluders, and thus render them hateful to the people. He enhanced his services to the country-party by a new Popish plot more tremendous than any of the foregoing, and in which he brought in the duke of York as a principal accomplice.

The king imprisoned Fitzharris; the commons avowed his cause. They voted that he should be impeached by themselves, to foreen him from the ordinary forms of justice: the lords rejected the impeachment; the commons asserted their right: a commotion was likely to ensue; and the king, to break off the contest, went to the house and dissolved the parliament, with a fixed resolution never to call another.

From this moment the king ruled with despotic power. His temper, which had always been easy and merciful, now became arbitrary and cruel; he entertained spies and informers round the throne, and imprisoned all such as he thought most daring in their designs. He resolved to humble the presbyterians: they were divested of their employments and their places; and their offices given to such as held with the court, and approved the doctrine of non-resistance. The clergy began to testify their zeal and their principles by their writings and sermons; but though among these the partizans of the king were the most numerous, those of the opposite faction were the most enterprising. The king openly espoused the cause of the former; and thus placing himself at the head of a faction, he deprived the city of London, which had long headed the popular party, of their charter. It was not till after an abject submission that he restored it to them, having previously subjected the election of their magistrates to his immediate authority.

Terrors also were not wanting to confirm this new species of monarchy. Fitzharris was brought to a trial before a jury, and condemned and executed. The whole gang of spies, witnesses, informers, suborners, which had long been encouraged and supported by the leading patriots, finding now that the king was entirely master, turned short upon their ancient drivers, and offered their evidence against those who first put them in motion. The king's ministers gave them encouragement; and in a short time the same injustice and the same cruelties were practised against presbyterian schemes, that had formerly been practised against Catholic treasons. The king's chief resentment was levelled against the earl of Shaftesbury; and, indeed, not without reason, as he had had a very active hand in the late disturbances. No sums were spared to seek for evidence, or even to suborn witnesses, against this intriguing and formidable man. A bill of indictment being presented to the grand jury, witnesses were examined, who swore to such incredible circumstances as must have invalidated their testimony, even if they had not been branded as perjured villains. Among his papers, indeed, a draught of an association was found, which might have been construed into treason; but it was not in the earl's hand-writing, nor

could it be proved that he had ever communicated this scheme to any body, or signified his approbation of any such project. The sheriffs had summoned a jury, whose principles coincided with those of the earl; and that probably, more than any want of proof, procured his safety.

In 1683, the city of London was deprived of its charter; which was restored only upon terms of the utmost submission, and giving up the nomination of their own magistrates. This was so mortifying a circumstance, that all the other corporations in England soon began to fear the same treatment, and were successively induced to surrender their charters into the hands of the king. Considerable sums were exacted for restoring these charters; and all the offices of power and profit were left at the disposal of the crown. Resistance now, however justifiable, could not be safe; and all prudent men saw no other expedient but submitting patiently to the present grievances.

There was a party, however, in England, that still cherished their former ideas of freedom, and resolved to restore liberty to their country by dethroning the king who acted in such a despotic manner. The principal conspirators were Monmouth, Shaftesbury, Russel, Effex, Howard, Algernon Sidney, and John Hamblen grandson to the great man of that name. Monmouth engaged the earl of Macclesfield, Lord Brandon, Sir Gilbert Gerard, and other gentlemen in Cheshire. Lord Russel fixed a correspondence with Sir William Courtney, Sir Francis Knowles, and Sir Francis Drake, who promised to raise the west. Shaftesbury, with one Ferguson, an independent clergymen, and a restless plotter, managed the city, upon which the confederates chiefly relied. These schemes had been laid in 1681: but the caution of lord Russel, who induced the duke of Monmouth to put off the enterprize, saved the kingdom from the horrors of a civil war; while Shaftesbury was so struck with a sense of his impending danger, that he left his house, and, lurking about the city, attempted, but in vain, to drive the Londoners to an open insurrection. At last, enraged at the numberless cautions and delays which clogged and defeated his projects, he threatened to begin with his own friends singly. However, after a long struggle between fear and rage, he abandoned all hopes of success, and fled to Amsterdam, where he soon after died.

The loss of Shaftesbury, though it retarded, did not suppress, the designs of the conspirators. The remaining six formed a council; they corresponded with Argyle and the malecontents in Scotland; and resolved to prosecute the scheme of the insurrection, tho' they widely differed in principles from one another. Monmouth aspired at the crown; Russel and Hamden proposed to exclude the duke of York from the succession, and redress the grievances of the nation; Sidney was for restoring the republic, and Effex joined in the same wish. Lord Howard was an abandoned man, who, having no principles, sought to embroil the nation, to gratify his private interest in the confusion.

Besides these, there was a set of subordinate conspirators, who frequently met together, and carried on projects quite unknown to Monmouth and his council. Among these was colonel Rumley, an old republican officer; lieutenant-colonel Walcott, of the same stamp; Goodenough, under-sheriff of London, a zealous

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250
Other corporations resign theirs.

251
Conspiracy against the king.

247
Parliament dissolved.

248
Arbitrary proceedings of the king.

249
London deprived of its charter.

252
Design of assassinating him formed.

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and noted party-man; Ferguson, an independent minister; and several attorneys, merchants, and tradesmen of London. But Rumley and Ferguson were the only persons that had access to the great leaders of the conspiracy. These men undertook the desperate resolution of assassinating the king in his way to New-market; Rumbold, one of the party, possessed a farm upon that road, called the *Rye-house*, and from thence the conspiracy was called the *Rye-house plot*. They deliberated on a scheme of stopping the king's coach by overturning a cart on the high way at this place, and shooting him through the hedges. The house in which the king lived at New-market accidentally took fire, and he was obliged to leave New-market eight days sooner than was expected; to which circumstance he owed his safety. Soon after this, the conspiracy was discovered; Russell, Sidney, and Walcot, were executed; Essex cut his own throat; Hambden was fined 40,000*l.*; and scarce one escaped who had been in any manner concerned, except the duke of Monmouth, who was the most culpable of all.

253
It militaries.

This was the last blood that was shed on account of plots or conspiracies, which continued during the greatest part of this reign. Severe punishments, however, were inflicted on many who treated the duke of York unworthily. The famous Titus Oates was fined 100,000*l.* for calling him a Popish traitor; and he was imprisoned till he should pay it, which he was absolutely incapable of. A similar sentence was passed upon Dutton Colt. Sir Samuel Barnadiston was fined 10,000*l.* for having, in some private letters, reflected on the government. The government of Charles was now as absolute as that of any prince in Europe; but, to please his subjects by an act of popularity, he judged it proper to marry the lady Anne, his niece, to prince George brother to the king of Denmark. This was the last remarkable transaction of this extraordinary reign. On February 24 1685, about eight in the morning, the king was seized with a fit of the apoplexy; being dressed, and just come out of his closet, where he had been for some time after he rose from bed. By being blooded, he was restored perfectly to his senses; and there were great hopes of his recovery the next day. On the fourth day the physicians despaired of his life, and therefore sent for the queen. He was in his perfect senses when she arrived. She threw herself on her knees, and asked his pardon for all her offences. He replied, that she had offended in nothing; but that he had been guilty of offences against her, and asked her pardon. He spoke with great affection to the duke of York, and gave him excellent counsel for his future conduct. He advised him to adhere to the laws with strictness, and invariably to support the church of England. The duke seemed anxious to convince him before he died how little he intended to follow his advice. Having removed the bishops, and several of the lords who attended the bed of the king, he sent for Huddleston, a Romish priest. In the presence of the duke, the earl of Bath, and Trevannion a captain in the guards, Huddleston gave the extreme unction to the king, and administered to him the sacrament according to the rites of the church of Rome. All this was done in the space of half an hour. The doors were then thrown open. Six prelates, who had before attended the king, were sent for to give him the

254
Death of Charles II.

sacrament. Kenn, bishop of Bath and Wells, read the visitation of the sick; and, after he said that he repented of his sins, the absolution. The king assented with seeming devotion at the service; but his mouth being distorted with fits, and his throat contracted, he could not swallow the elements. He professed, however, his satisfaction in the church of England; and expired on the 6th of February, between 11 and 12 o'clock; having reigned 25 years, and lived 55.

The first act of James II.'s reign was to assemble the privy council: where, after some praises bestowed on the memory of his predecessor, he made professions of his resolution to maintain the established government both in church and state; and as he had heretofore ventured his life in defence of the nation, he would still go as far as any man in maintaining all its just rights and privileges.

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This discourse was received with great applause, not only by the council, but by the whole nation. Addresses came from all quarters, full of duty, nay of the most servile adulation. From this charge, however, we must except those of the Quakers, which is remarkable for its good sense and simplicity. "We are come (said they) to testify our sorrow for the death of our good friend Charles, and our joy for thy being made our governor. We are told that thou art not of the persuasion of the church of England no more than we: wherefore we hope that thou wilt grant us the same liberty which thou allowest thyself. Which doing, we with thee all manner of happiness."

255
Servile addresses to James II.

The king, however, soon showed, that he either was not sincere in his promises, or that he entertained so lofty an idea of his own legal power, that even his utmost sincerity could tend very little to the security of the liberties of the people. All the customs, and the greater part of the excise, which had been voted to the late king for his life only, were levied by James without a new act for that purpose. He went openly to masts with all the ensigns of his dignity; and even sent one Caryll as his agent to Rome to make submissions to the Pope, and to pave the way for the re-admission of England into the bosom of the Catholic church. From the suggestions of these men all his measures were undertaken. One day when the Spanish ambassador ventured to advise his majesty against putting too much confidence in such kind of people, "Is it not the custom in Spain (said James), for the king to consult with his confessor?" "Yes, (answered the ambassador), and that is the reason why our affairs succeed so very ill."

256
Quakers addressed.

James's first parliament, which was composed mostly of zealous Tories, was strongly inclined to comply with the measures of the crown. They voted unanimously, that they should settle on the present king, during life, all the revenue enjoyed by the late king till the time of his decease. For this favour, James assured them, that he would secure them in the full enjoyment of their laws; but with regard to religion, no answer could be extorted, for that he was resolved to alter. In every thing, however, religion excepted, James merited every praise. He applied himself to business with unremitting attention. He managed his revenue with the strictest economy. He retrenched superfluous expences, and shewed himself zealous for the glory of the nation. He endeavoured to expel from court the vice which had prevailed so much during the former reign, and to restore

257
Imprudent behaviour of the new king.

decency

258
In some respects he behaves well.

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decency and morality. He presided daily at the council, at the boards of admiralty and treasury. He even entered into the whole detail of the concerns of the great departments of the state. But his bigotry for the Romish religion sullied all his good qualities, and rendered him feared for his violence, where he was not despised for his weakness.

259
Monmouth's
conspiracy.

But whilst every thing was submitted in tranquillity to James at home, a storm was gathering abroad to disturb his repose. For a long time the prince of Orange had entertained hopes of ascending the British throne, and had even used all his endeavours to exclude James from it. Monmouth who, since his last conspiracy, had been pardoned, but ordered to depart the kingdom, had retired to Holland. He was received by the prince of Orange with the highest marks of distinction, and even became his chief favourite through whom all favours were to be obtained. When the news of Charles's death arrived, indeed, the prince made a shew of altering his note, and dismissed Monmouth, though he still kept a close correspondence with him. The duke retired to Brussels, where, under the auspices of the prince of Orange, he resolved to invade England, with a design of seizing the crown for himself. He was seconded by the duke of Argyle, who formed the scheme of an insurrection in Scotland; and while Monmouth attempted to make a rising in the west of England, it was resolved that Argyle should also try his endeavours in the north. The generosity of the prince of Orange, however, did not correspond with the warmth of his professions. The unfortunate duke derived from his own plate and jewels his whole supply for the war; and the enthusiasm of a rich widow supplied Argyle with 10,000*l.* wherewith he purchased three vessels, which he loaded with arms and ammunition.

260
Defeat and
death of
Argyle.

Argyle was the first who landed in Scotland, where he published his manifestoes, put himself at the head of 2500 men, and strove to influence the people in his favour. But a formidable body of the king's forces coming against him, his army fell away; and he himself, after being wounded in attempting to escape, was taken prisoner by a peasant who found him standing up to the neck in water. He was from thence carried to Edinburgh, where after suffering many indignities he was publicly executed.

261
Monmouth
lands in
England.

By this time Monmouth had landed in Dorsetshire with scarce 100 followers. His name, however, was so popular, and so great was the hatred of the people to James on account of his religion, that in four days he had assembled a body of above 2000 men. They were indeed all of them the lowest of the people, and his declarations were suited entirely to their prejudices. He called the king the duke of York; and denominated him a traitor, a tyrant, a murderer, and a Popish usurper. He imputed to him the fire of London, and even affirmed that he had poisoned the late king.

Monmouth continued to make a rapid progress, and in a short time found himself at the head of 6000 men; but was daily obliged to dismiss great numbers for want of arms. The king was not a little alarmed at his invasion. Six regiments of British troops were called over from Holland; and a body of regulars, to the number of 3000, were sent, under the command of the earl of Feversham and Churchill, to check the pro-

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262
Defeated at
Sedgemoor.

gress of the rebels. They took post at Sedgemoor, a village in the neighbourhood of Bridgewater, and were joined by considerable numbers of the country militia. Here Monmouth resolved, by a desperate effort, to lose his life, or gain the kingdom. He drove the royal infantry from their ground, and was on the point of gaining a complete victory, when the cowardice of Gray, who commanded the horse, brought all to ruin. This nobleman fled at the first onset; and the rebels, being charged in flank, gave way after a three-hours contest. About 300 were killed in the engagement, and 1000 in the pursuit. Monmouth fled above 20 miles from the field of battle, till his horse sunk under him. He then alighted; and, exchanging clothes with a shepherd, fled on foot, attended by a German count who had accompanied him from Holland. Being quite exhausted with hunger and fatigue, they both lay down in a field, and covered themselves with fern. The shepherd, being found in Monmouth's clothes by the pursuers, increased the diligence of the search; and by the means of blood-hounds he was detected in his miserable situation, with raw pease in his pocket, on which he had lived for some days. He burst into tears when seized by his enemies; and petitioned, with the most abject submissions, for his life. On his way to London, he wrote a submissive letter to the king, promising discoveries, should he be admitted into his presence. The curiosity of James being excited by the letter, he sent Sheldon a gentleman of the bed-chamber to meet Monmouth. In his conversation with Sheldon, he asked who was in chief confidence with the king; and being answered that it was Sunderland, Monmouth knocked his breast in a surprise, and said, "Why then, as I hope for salvation, he promised to meet me." He desired Sheldon to inform the king, that several of his accomplices in rebellion were in the confidence of his majesty; and he gave him a particular account of the part which the prince of Orange had acted in his whole affair.

263
Is taken in
a most mi-
serable situ-
ation.

264
Attempts in
vain to ob-
tain mercy.

Sheldon, on his return from the duke of Monmouth, began to give an account to the king of what he had learned from the unhappy prisoner. Sunderland, pretending business, came into the room. Sheldon stopped, and signified his desire to speak in private with the king. James told him he might say any thing before that lord. Sheldon was in great perplexity; but being urged, he told all that Monmouth had asserted. Sunderland appeared, for some time, confused; at length he said, with a laugh, "If that is all he can discover to save his life, he will derive little good from his information." Monmouth himself was soon after brought before the king. Sunderland by an artifice ensured the death of the unfortunate duke, to save himself and the other adherents of the prince of Orange. When he saw Monmouth's letter to James, and heard the discoveries made by Sheldon, he is said to have advised him, that, as he could assure him of the certainty of a pardon, he ought to deny what he had said in prejudice of his friends, who could serve him on some other more favourable occasion. The credulous duke, swayed by the advice of Sunderland, suppressed what he had said to Sheldon, when he was examined by the king. He mentioned nothing of the concern which the prince of Orange had taken in the invasion; tho' a point on which James was already sufficiently informed. D'Avaux, the French minister to the States, had

given

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given a circumstantial account of the whole conduct of the prince to Lewis XIV. who had ordered it to be privately communicated to the king of England. The minister who had been sent from Holland to congratulate James on the suppression of Argyle's rebellion, was in a grievous agony when he heard that the king was resolved to see Monmouth. "Though he found that he said nothing of his master, (said James), he was never quiet till Monmouth was dead."

The unfortunate duke made various attempts to obtain mercy. He wrote to the queen dowager; he sent a letter to the reigning queen, as well as to the king himself. He begged his life, when admitted into his presence, with a meanness unsuitable to his pretensions and high rank. But all his entreaties and submissions were of no avail. James told him, that he was much affected with his misfortunes, but that his crime was too dangerous in its example to be left unpunished. In his last moments he behaved with a magnanimity worthy of his former courage. When he came to the scaffold, he behaved with decency and even with dignity. He spoke little; he made no confession; nor did he accuse any of his friends. Circumstances are said to have attended his death that created a horror among the spectators. The executioner missed his blow, and struck him slightly on the shoulder. Monmouth raised his head from the block, and looked him full in the face, as if reproaching him for his mistake. He struck him twice again, but with feeble strokes; and then threw the ax from his hands. The sheriff forced him to renew his attempt; and the head of the duke, who seemed already dead, was at last severed from his body.

267
Terribly
mangled by
the executioner.

268
Rebels cruelly treated.

Those concerned in the duke of Monmouth's conspiracy were punished with the utmost severity. Immediately after the battle of Sedgemoor, Feverham hanged up above 20 prisoners; and was proceeding in his executions, when the bishop of Bath and Wells informed him that these unhappy men were now by law intitled to a trial, and that their execution would be deemed a real murder. Nineteen were put to death in the same manner at Bridgewater, by colonel Kirke, a man of a savage and bloody disposition. This vile fellow, practised in the arts of slaughter at Tangier, where he served in garrison, took pleasure in committing instances of wanton barbarity. He ravaged the whole country, without making any distinction between friend and foe. His own regiment, for their peculiar barbarity, went under the ironical title of *Kirke's lambs*. It doth not, however, appear that these cruelties were committed by the direction, or even with the approbation, of James; any more than the legal slaughters that were committed by judge Jefferies, who was sent down to try the delinquents. The natural brutality of this man's temper was inflamed by continual intoxication. No fewer than 80 were executed by his orders at Dorchester; and on the whole, at Exeter, Taunton, and Wells, 250 are computed to have fallen by the hand of justice as it was called; nor were women exempted from the general severity, but suffered for harbouring their nearest kindred. Jefferies on his return was immediately created a peer, and soon after vested with the dignity of chancellor. In justice to the king, however, it must be owned, that in his memoirs he complains, with apparent indignation, of "the strange havoc made by Jefferies and Kirke in the

west;" and that he attributed the unpopularity, which afterwards deprived him of the crown, to the violence and barbarity of those pretended friends of his authority. He even ascribes their ferocities, in some degree, to a formed design of rendering his government odious to his subjects; and from hence it is probable, that no exact or impartial accounts of these cruelties had reached his ears, at least till long after they were committed.

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James now began to throw off the mask, and to endeavour openly to establish Popery and arbitrary power. He told the house of commons, that the militia were found by experience to be of no use; that it was necessary to augment the standing army; and that he had employed a great many Catholic officers, in whose favour he had thought proper to dispense with the test required to be taken by all who were employed by the crown. He found them useful, he said, and he was determined to keep them employed. These stretches of power naturally led the lords and commons into some degree of opposition; but they soon acquiesced in the king's measures, and then the parliament was dissolved for their tardy compliance. This was happy for the nation; for it was perhaps impossible to pick out another house of commons that could be more ready to acquiesce in the measures of the crown; but the dissolution of this parliament was generally looked upon as a sign that James never intended to call another.

269
James endeavours to establish Popery.

268
Parliament dissolved.

The parliament being dismissed, James's next step was to secure a Catholic interest in the privy council. Accordingly four Catholic lords were admitted, *viz.* Powis, Arundel, Belasis, and Dover. Sunderland, who saw that the only way to gain preferment was by Popery, became a convert. Rochester, the treasurer, was turned out of his office, because he refused to conform. Even in Ireland, where the duke of Ormond had long supported the royal cause, this nobleman was displaced as being a Protestant; and the lord Tyrconnel, a furious Roman-catholic, was placed in his stead. In his zeal for Popery, it is said, that James stooped so low as even to attempt the conversion of colonel Kirke: but the daring soldier told him, that he was pre-engaged; for he had promised the king of Morocco, when he was quartered at Tangiers, that, if ever he changed his religion, he would turn Mahometan.

269
Catholics promoted.

At last the clergy of the church of England began to take the alarm, and commenced an opposition to court measures. The pulpits now thundered out against Popery; and it was urged, that it was more formidable from the support granted it by the king. It was in vain that James attempted to impose silence on these topics; instead of avoiding the controversy, the Protestant preachers pursued it with greater warmth.

270
English clergy oppose the court measures.

To effect his designs, the king determined to revive the highcommission court, which had formerly given the nation so much disgust, and which had been abolished for ever by act of parliament. An ecclesiastical commission was issued out anew, by which seven commissioners were invested with a full and unlimited authority over the whole church of England.—The next step was to allow a liberty of conscience to all sectaries; and he was taught to believe that the truth of the Catholic religion would then, upon a fair trial, gain the victory. In such a case, the same power that granted liberty of conscience

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conscience might refrain it; and the Catholic religion alone be allowed to predominate. He therefore issued a declaration of general indulgence, and asserted that non-conformity to the established religion was no longer penal. In Scotland, he ordered his parliament to grant a toleration only to the Catholics, without interceding in the least for the other dissenters who were much more numerous. In Ireland, the Protestants were totally expelled from all offices of trust and profit, and Catholics put in their places. These measures sufficiently disgusted every part of the British empire; but, to complete the work, James publicly sent the earl of Castlemaine ambassador extraordinary to Rome, in order to express his obedience to the Pope, and reconcile his kingdoms to the Catholic communion. This proceeding was too precipitate to be relished even by the Pope himself; and therefore the only return he made to this embassy was the sending a nuncio into England. The nuncio made a public and solemn entry into Windsor; which did not fail to add to the general discontent; and because the duke of Somerset refused to attend the ceremony, he was dismissed from his employment of one of the lords of the bed-chamber.

Soon after this, the Jesuits were permitted to erect colleges in different parts of the kingdom, and to exercise the Catholic worship in the most public manner. Father Francis, a benedictine monk, was recommended by the king to the university of Cambridge, for the degree of master of arts. The university rejected him on account of his religion; and presented a petition to the king, beseeching him to recall his mandate. James disregarded their petition, and denied their deputies a hearing; the vice-chancellor himself was summoned to appear before the high commission court, and deprived of his office: yet the university persisted, and father Francis was refused. The place of president of Magdalen college being vacant, the king sent a mandate in favour of one Farmer, a new convert, and a man of bad character in other respects. The fellows of the college made very submissive applications for recalling his mandate; but the election-day coming on before they received an answer, they chose Dr Hough, a man of learning, integrity, and resolution. The king was incensed at their presumption; an inferior ecclesiastical court was sent down, who finding Farmer a man of scandalous character, issued a mandate for a new election. The man now recommended by the king was doctor Parker; a man of an abandoned character, but very willing to embrace the Catholic religion. The fellows refused to comply with this injunction; which so irritated the king, that he came down to Oxford in person, and ordered the fellows to be brought before him. He reproached them with their infidelity and disobedience; and commanded them to choose Parker without delay. Another refusal on their side served still more to exasperate him; and finding them resolute in the defence of their privileges, he ejected them all except two from their benefices, and Parker was put in possession of the place. Upon this, the college was filled with Catholics; and Charnock, one of the two that remained, was made vice-president.

In 1688, a second declaration for liberty of conscience was published almost in the same terms with the former; but with this peculiar injunction, that all divines should read it after service in their churches. The

clergy resolved to disobey this order. Loyde bishop of St Asaph, Ken of Bath and Wells, Turner of Ely, Lake of Chichester, White of Peterborough, and Trelawney of Bristol, together with Sancroft the primate, concerted an address in form of a petition to the king, which, with the warmest expressions of zeal and submission, remonstrated, that they could not read his declaration consistent with their consciences, or the respect they owed the Protestant religion. The king received their petition with marks of surprise and displeasure. He said he did not expect such an address from the church of England, particularly from some amongst them; and persisted in his orders for their obeying his mandate.

As the petition was delivered in private, the king summoned the bishops before the council, and there questioned them whether they would acknowledge it. They for some time declined giving an answer; but being urged by the chancellor, they at last owned the petition. On their refusal to give bail, an order was immediately drawn for their commitment to the Tower, and the crown lawyers received directions to prosecute them for a seditious libel. The king gave orders that they should be conveyed to the Tower by water, as the whole city was in commotion in their favour. The people were no sooner informed of their danger, than they ran to the river-side in prodigious multitudes, craving their blessing; calling upon heaven to protect them, &c. The very soldiers by whom they were guarded, knelt down before them, and implored their forgiveness.

The 29th of June 1688 was fixed for the trial of the bishops; and their return was still more splendidly attended than their imprisonment. Twenty-nine peers, a great number of gentlemen, and an immense crowd of people, waited upon them to Westminster-hall. The dispute was learnedly managed by the lawyers on both sides. The jury withdrew into a chamber where they passed the whole night; but next morning they returned into court, and pronounced the bishops not guilty. Westminster-hall instantly rang with loud acclamations, which were communicated to the whole extent of the city. They even reached the camp at Hounslow, where the king was at dinner in lord Feverham's tent. His majesty demanding the cause of those rejoicings, and being informed that it was nothing but the soldiers shouting for the delivery of the bishops; "Call you that nothing! (cried he); but so much the worse for them." Immediately after this, the king struck out two of the judges, Powel and Holloway, who had appeared to favour the bishops. He issued orders to prosecute all those clergymen who had not read his declaration, and all had refused it except 200. He sent also a mandate to the new fellows, whom he had obtruded on Magdalen college, to elect for president, in the room of Parker lately deceased, one Gifford, a doctor of the Sorbonne, and titular bishop of Madura.

As the king found the clergymen every where averse to his measures, he was willing next to try what he could do with the army. He thought, if one regiment should promise implicit obedience, their example would soon induce others to comply. He therefore ordered one of the regiments to be drawn up in his presence, and desired that such as were against his late declaration of liberty of conscience should lay down their arms.

He

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271 James sends an ambassador to Rome.

272 Bishops imprisoned.

273 The whole city in commotion in their favour.

274 Dispute with the university of Cambridge.

276 They are acquitted.

273 College filled with Catholics.

277 Attachment of the army to the Protestant religion.

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He was surprised to see the whole battalion ground their arms, except two officers and a few Roman-catholic soldiers.—A fortunate circumstance happened about this time in his family. A few days before the acquittal of the bishops, the queen was brought to bed of a son, who was baptized by the name of *James*. This would, if any thing could at that time, have served to establish him on the throne: but so great was the animosity against him, that a story was propagated that the child was supposititious; and so great was the monarch's pride, that he scorned to take any precautions to refute the calumny.

Though the enthusiasm of James himself bordered upon madness, the most wild of his religious projects seem to have been suggested by his enemies to accomplish his ruin. The earl of Sunderland, whom he chiefly trusted, was a man of abandoned principles, insatiable avarice, and fitted by nature for stratagem, deception, and intrigue. The love of money was his ruling passion, and he sold his influence to the highest bidder. To such a degree was he mercenary, that he became at once the pensioner of the prince of Orange and of the king of France. The former, who had long fixed his eye on the English throne, watched James's motions, and took every advantage of his errors. He had laid his schemes so extensively, that nothing but the birth of a male heir to the crown of England could possibly prevent him from an almost immediate possession of the kingdom. He had the address to render two thirds of the powers of Europe interested in his success. The treaty of Augsburg, formed to break the power of France, could not accomplish its object without the accession of England. The house of Austria, in both its branches, preferred their political views to their zeal for the Roman faith, and promoted the dethronement of James as the only means to humble Lewis XIV. Odescalchi, who under the name of Innocent XI. filled then the papal chair, was gained to the measures of the prince of Orange by other considerations, as well as through his fixed aversion to France. The prince of Orange sent his intimate friend the prince of Vaudemont to Rome, to procure the aid of the Pope. He explained to his Holiness, that the Catholic princes were in the wrong to expect any advantage to their faith from James, as his being a declared Papist rendered his people averse to all his measures. As for himself, should he have the good fortune to mount the throne of England, he might take any step in favour of the Roman-catholics without jealousy; and he promised to procure a toleration for the Papists, should the Pope, the emperor, and the king of Spain, favour his attempt. This negotiation procured the desired effect. Innocent contributed, with the money of the church, to expel a Roman-catholic prince from his throne.

Though the contest with the bishops had completed the king's unpopularity, he derived the fuddeness of his ruin from the birth of a prince of Wales. That circumstance increased the fears of his subjects in proportion as it raised his security and hopes. In the reign of a prince to be educated under the prejudices of such a father nothing but a continuance of the same unconstitutional measures could be expected. So low indeed was his credit sunk among his people at this time, and such presence they all seemed to have of his fate, that the child had like to have died before a wet nurse could

be procured to suckle him.

The prince of Orange, seeing the national discontent now raised to the highest pitch, resolved to take advantage of it. He began by giving one Dykevelt, his envoy, instructions to apply in his name to every religious sect in the kingdom. To the church-party he sent assurances of favour and regard; and protested, that his education in Holland had noway prejudiced him against episcopacy. To the non-conformists he sent exhortations, not to be deceived by the insidious caresses of their known enemy, but to wait for a real and sincere protector, &c. In consequence of these insinuations, the prince soon received invitations from the most considerable persons in the kingdom. Admirals Herbert and Russel assured him in person of their own and the national attachment. Henry Sidney, brother to Algernon, and uncle to the earl of Sunderland, came over to him with assurances of an universal combination against the king. Lord Dumbline, son to the earl of Danby, being master of a frigate, made several voyages to Holland, and carried from many of the nobility tenders of duty and even considerable sums of money to the prince of Orange. Soon after, the bishop of London, the earls of Danby, Nottingham, Devonshire, Dorset, and several other lords, gentlemen, and principal citizens, united in their addresses to him, and intreated his speedy descent. The people, though long divided between whig and tory, now joined against their unhappy sovereign as a common enemy. William therefore determined to accept of their invitations; and this the more readily, as he perceived the malecontents had conducted themselves with prudence and secrecy. Having the principal servants of James in pay, he was minutely informed of the most secret actions and even designs of that prince. His intelligence came, through Sidney, from Sunderland, who betrayed the very measures which he himself had advised. The prince had a fleet ready to sail, and troops provided for action, before the beginning of June 1688.

The king of France was the first who gave James warning of his danger, and offered to assist him in repelling it. But he declined this friendly offer, lest it should be said that he had entered into a private treaty with that monarch to the prejudice of the Protestant religion. Being also deceived and betrayed by Sunderland, he had the weakness to believe, that the reports of an invasion were invented in order to frighten him into a strict connexion with France. He gave credit to the repeated assurances of the states, that the armament prepared in their ports was not designed against England. Nay, he even believed the assertions of the prince himself, whose interest it was to deceive. Sunderland deserted against the possibility of an invasion, and turned to ridicule all who believed the report. Having by the prior consent of James taken possession of all the foreign correspondence, he suppressed every intelligence that might alarm; and even all others whom James trusted, except Dartmouth, affected long to give no faith to the reports of an invasion.

Lewis, finding his first offers rejected, next proposed to march down his army to the frontiers of the Dutch provinces, and thus detain their forces at home for their own defence. But this proposal met with no better reception than the former. Still Lewis was unwilling to abandon a friend and ally whose interest he regarded

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281
He applies to James's subjects.

282
By whom he is invited into England.

283
James warned of his danger by Lewis XIV.

284
He rejects all assistance.

278
Birth of a prince of Wales.

279
Treachery of Sunderland.

280
Schemes of the prince of Orange.

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c. 110.
flamant on
the news of
intended
evacuation.286
He is again
betrayed by
Sunderland.287
James at-
tempts to
seducy his
subjects.288
But in vain.289
William
lands in
England.

garded as closely connected with his own. He ventured to remonstrate with the Dutch against the preparations they were making to invade England. The Dutch treated his remonstrance as an officious impertinence, and James himself declined his mediation.

The king of England, having thus rejected the assistance of his friends, and being left to face the danger alone, was afflicted with an advice from his minister in Holland, that an invasion was not only projected, but avowed. When he first read the letter containing this information, he grew pale, and the letter dropt from his hand. He saw himself on the brink of destruction, and knew not to whom to apply for protection. In this emergency, Lewis wrote to James in his own hand, that, to divert the Dutch from their intended invasion of England, he would lay siege to Maelbricht with 30,000 men. James communicated this intelligence to Sunderland, and he to the prince of Orange. Six thousand men were thrown into Maelbricht; and the design of Lewis, as being impracticable, was laid aside. On this, Lewis, being disgusted with James, turned his arms towards Germany. The dauphin laid siege to Philipsburgh on the 5th of October; and prince Clement of Bavaria, by throwing a strong garrison into Cologne, effectually secured the states of Holland from any sudden danger from the arms of France.

James had now no resource but in retreating from those precipitate measures which had plunged him into inextricable distress. He paid court to the Dutch, and offered to enter into any alliance with them for their common security. He replaced in all the counties of England all the deputy lieutenants and justices who had been deprived of their commissions for their adherence to the test and penal laws. He restored the charters of such corporations as he had possessed himself of; he annulled the high commission court; he reinstated the expelled president and fellows of Magdalen college; and was even reduced to caress those bishops whom he had so lately persecuted and insulted.

All these concessions, however, were now too late; they were regarded as the effects of fear, and not of repentance. Indeed, it is said, he very soon gave proofs of his insincerity: for, hearing that the Dutch fleet was dispersed, he recalled those concessions he had made in favour of Magdalen college; and, to show his attachment to the Romish church, at the baptism of the prince of Wales he appointed the Pope one of the sponsors.

In the mean time, William set sail from Helvoetsluys with a fleet of near 500 vessels, and an army of above 14,000 men. Fortune, however, seemed at first every way unfavourable to his enterprise. He was driven back by a dreadful storm; but he soon resisted his fleet, and again set sail for England. It was given out that this invasion was designed for the coasts of France; and many of the English, who saw the fleet pass along their coasts, little suspected the place of its destination. It happened that the same wind which sent the Dutch to their place of destination, detained the English fleet in the river: so that the Dutch passed the straits of Dover without molestation; and, after a voyage of two days, landed at Broxholme in Torbay, on the 5th of November, the anniversary of the gunpowder treason.

But though the invitation from the English was very general, the prince for some time had the mortification

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to find himself joined by very few. He continued for ten days in expectation of being joined by the malcontents, and at last was going to despair of success. But just when he began to deliberate about reembarking his forces, he was joined by several persons of consequence, and the whole country soon after flocked to his standard. The first person that joined the prince was major Durrington, and he was quickly followed by the gentry of the counties of Devon and Somerset. Sir Edward Seymour made proposals for an association, which was signed by great numbers; and every day there appeared some effect of that universal combination into which the nation had entered against the measures of the king.

This was followed by the defection of the army. Lord Colchester, son to the earl of Rivers, first deserted to the prince. Lord Cornbury, son to the earl of Clarendon, carried off the greatest part of three regiments of cavalry at once; and several officers of distinction informed Feverham their general, that they could not in honour fight against the prince of Orange. Soon after this, the unhappy monarch found himself deserted by his own servants and creatures. Lord Churchill had been raised from the rank of a page, and had been invested with an high command in the army; he had been created a peer, and owed his whole fortune to the king's bounty: yet even he deserted among the rest; and carried with him the duke of Grafton natural son to the late king, colonel Berkley, and some others.

In this universal defection, James, not knowing where to turn, began to think of requesting assistance from France when it was now too late. He wrote to Leopold emperor of Germany: but in vain; that monarch only returning for answer, That what he had foreseen had happened. James had some dependence on his fleet; but they were entirely disaffected. In a word, his interests were deserted by all, for he had long deserted them himself. He still found his army, however, to amount to 20,000 men; and had he led them immediately to battle, it is possible they might then have fought in his favour. But James's misfortunes had deprived him of his natural firmness and resolution; and, seeing himself deserted by those in whom he thought he could have placed most confidence, he became suspicious of all, and was in a manner deprived even of the power of deliberation. In this extremity of distress, the prince of Denmark, and Anne James's favourite daughter, perceiving the desperation of his circumstances, cruelly resolved to take part with the prince of Orange. When the king was informed of this, he was stung with the most bitter anguish. "God help me (cried he), my own children have forsaken me." To add to his distress as a parent, he was accused of being accessory to the death of his own child. Her nurse, and her uncle the earl of Clarendon, went up and down like distracted persons, affirming that the Papists had murdered the princess. They publicly asked the queen's servants whither they had conveyed her? and they contributed to inflame the populace, whose zeal had already inflamed them to tumult and disorder. It was, however, soon known that she fled, under the conduct of the bishop of London, to Northampton.

On the 30th of November 1688, James sent three of his noblemen to treat with the prince of Orange. But though the latter knew very well that the king's com-

8 U

missioners

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Haughty
But behaviour
of William.

missioners were in his interests, his behaviour showed plainly that he now thought the time of treating was past. For some time he would not admit them to an audience; and, when he did, would give no satisfactory answer. James now began to be afraid of his personal safety. But what most affected him was the terrors of the queen for herself and her infant son. He therefore resolved to send them abroad. They crossed the river in a boat, at Whitehall, in a stormy and rainy day. They were carried to Gravesend in a coach, under the conduct of the count de Lauzun. A yacht, commanded by captain Gray, which lay there ready for the purpose, soon transported them in safety to Calais.

293
James at-
tempts to
leave the
kingdom.

The king was now so dispirited and distracted, that he resolved to leave the kingdom at once, and thus throw every thing into confusion. He threw the great seal into the Thames; he left none with any authority to conduct affairs in his absence; and he vainly hoped to derive advantage to his affairs from anarchy and disorder. About twelve at night, on the 10th of December, he disguised himself, took boat at Whitehall, and crossed the river. Sir Edward Hales, with another friend, met him at Vauxhall with horses. He mounted; and being conducted through by-ways by a guide, he passed in the night-time to the Medway, which he crossed by Aylesford-bridge. At Woolpeck he took fresh horses, sent thither before by Sheldon one of his equerries who was in the secret of his flight. He arrived at ten o'clock at Embsy ferry near Feverham, where a customhouse hoy, hired by Sir Edward Hales, lay ready to receive them on board. But the wind blew fresh, and the vessel had no ballast. The master, therefore, easily persuaded the king to permit him to take in ballast at Shilness. It being half ebb when they ran ashore, they designed to fail as soon as the vessel should be afloat. But when the vessel was almost afloat, she was boarded by three fisher-boats belonging to Feverham, containing 50 men. They seized the king and his two companions, under pretence of their being Papists that wanted to escape from the kingdom. They turned up Feverham water with the tide; but still the king remained unknown. Sir Edward Hales placed privately 50 guineas in the hands of the captain, as an earnest of more should he permit them to escape. He promised: but was so far from keeping his word, that he took what money they had, under pretence of securing it from the seamen; and, having possessed himself of their all, he left them to their fate. The unfortunate fugitives were at length carried in a coach to Feverham, amid the insults, clamours, and shouts, of the sailors.

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Is seized and
insulted.

When the king was brought to the inn, a seaman, who had served under him, knew him, and melted into tears; and James himself was so much moved at this instance of his affection, that he wept. The other fishermen, who had treated him with such indignity before, when they saw his tears, fell upon their knees. The lower inhabitants of the whole village gathered round him; but the better sort fled from his presence. The seamen, however, formed themselves into a guard round him, and declared that "a hair of his head should not be touched." In the mean time, Sir James Oxendon, under the pretence of guarding him from the rabble, came with the militia to prevent his escape. The king found a change in his condition when he was taken out of the hands of the sailors. The commanders of the militia

295
His great
diffress.

showed him no respect. He was even insulted by the common soldiers. A letter which he intended to send to London for clothes, a change of linen, and some money, was stopped by those who pretended to protect his person.

All things in the mean time ran into confusion at London, and the prince of Orange exercised in his own person all the functions of royalty. He issued a declaration to the disbanded army to reassemble themselves. He ordered the secretary at war to bring him a list of the king's troops. He commanded the lord Churchill to collect his troop of horse-guards. He sent the duke of Grafton to take possession in his name of Tilbury fort. The assembly of peers adjourned to the council-chamber at Whitehall; and, to give the appearance of legality to their meeting, chose the marquis of Halifax for their president. While this assembly was sitting, on the 13th of December, a poor countryman, who had been engaged by James, brought an open letter from that unfortunate prince to London. It had no superscription; and it was addressed to none. It contained, in one sentence only, his deplorable condition when in the hands of a desperate rabble. This poor messenger of their fallen sovereign had long waited at the council door, without being able to attract the notice of any who passed. The earl of Mulgrave at length, apprised of his business, had the courage to introduce him to the council. He delivered his open letter, and told the state of the king with tears. The assembly were so much moved, that they sent the earl of Feverham with 200 of the guards towards Feverham. His instructions were to rescue him first from danger, and afterwards to attend him to the sea-coast, should he chuse to retire. He chose, however, to return to London; but the prince of Orange sent a message to him desiring him to advance no nearer the capital than Rochester. The messenger missed James by the way. The king sent Feverham with a letter to the prince of Orange, requesting his presence in London to settle the nation. He himself proceeded to that place, and arrived on the 16th of December. Doubting the fidelity of the troops who were quartered at Westminster, he chose to pass through the city to Whitehall. Never prince returning with victory to his capital was received with louder acclamations of joy. All the streets were covered with bonfires. The bells were rung, and the air was rent with repeated shouts of gladness. All orders of men crowded to his coach; and, when he arrived at Whitehall, his apartments were crowded with people who came to express their joy at his return.

296
James re-
turns to
London.

The prince of Orange received the news of his return with an haughty air. His aim from the beginning was to force him by threats and severities to relinquish the throne. The Dutch guards were ordered to take possession of Whitehall, and to displace the English. The king was soon after commanded by a message, which he received in bed at midnight, to leave his palace next morning, and to depart for Ham, a seat of the dukes of Lauderdale's. He desired, however, permission to retire to Rochester, a town not far from the sea-coast, and opposite to France. This was readily granted; and it was now perceived that the harsh measures of the prince had taken effect, and that the king meditated an escape to France.

The king, surrounded by the Dutch guards, arrived

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Command-
ed by Wil-
liam to leave
his palace.

Britain.

at Rochester, on the 19th of December. The restraint put upon his person, and the manner in which he had been forced from London, raised the indignation of many, and the compassion of all. The English army, both officers and soldiers, began to murmur; and had it not been for the timidity and precipitation of James himself, the nation had certainly returned to their allegiance. He remained three nights at Rochester, in the midst of a few faithful friends. The earls of Ar-
 ran, Dumbarton, Ailsbury, Litchfield, and Middleton, were there; and with other officers of merit, the gallant lord Dundee. They argued against his flight with united efforts. Several bishops, some peers, and many officers, intreated his stay in some part of England. Message followed message from London. They represented that the opinions of men began to change, and that events would daily rise in favour of his authority. Dundee added his native ardour to his advice. "The question, Sir, (said he), is, Whether you shall stay in England, or fly to France? Whether you shall trust the returning zeal of your native subjects, or rely on a foreign power? Here you ought to stand. Keep possession of a part, and the whole will submit by degrees. Resume the spirit of a king. Summon your subjects to their allegiance. Your army, though disbanded, is not dispersed. Give me your commission. I will gather 10,000 of your troops. I will carry your standard at their head through England, and drive before you the Dutch and their prince." The king replied, "that he believed it might be done; but that it would raise a civil war, and he would not do so much mischief to a nation that would so soon come to their senses again." Middleton urged his stay, though in the remotest part of the kingdom. "Your majesty, (said he), may throw things into confusion by your departure; but it will be but the anarchy of a month: a new government will soon be settled, and you and your family will be ruined." These spirited remonstrances had no effect upon James. He resolved to quit the kingdom; and having communicated his design to a few of his friends, he passed at midnight through the back-door of the house where he lodged, and with his son the duke of Berwick, and Biddulph one of his servants, went in a boat to a smack, which lay waiting for him without the fort of Sheerness. By reason of a hard gale they were forced to bear up toward Leigh, and to anchor on the Essex-side, under the lee of the land. When the gale slackened, they reached the Buoy of the Narrows without tacking; but not being able to weather the Goodwin, they were forced to fail through the downs. Seven ships lay there at anchor; but the smack passed unquestioned along. Unable to fetch Calais, she bore away for Boulogne, and anchored before Ambleteuse. The king landed at three o'clock in the morning of Tuesday, December 25th; and taking post, soon joined his queen at St Germain.

James having thus abandoned his dominions, the prince of Orange remained master of them of course. By the advice of the house of lords, the only member of the legislature remaining, he was desired to summon a parliament by circular letters; but the prince, unwilling to act upon so imperfect an authority, convened all the members who had sat in the house of commons during any parliament of Charles II. and to these were added the mayor, aldermen, and fifty of the common

council of London; and the prince, being thus supported by an assembly deriving its authority from himself, wrote circular letters to the counties and corporations of England to call a new parliament.

The house being met, which was mostly composed of the Whig party, thanks were given to the prince of Orange for the deliverance he had brought them; after which they proceeded to settle the kingdom. A vote soon passed both houses, that king James II. having endeavoured to subvert the constitution of the kingdom, by breaking the original contract between the king and his people; and having by the advice of Jesuits and other wicked persons violated the fundamental laws, and withdrawn himself out of the kingdom; had abdicated the government, and that the throne was thereby vacant.

The king being thus deposed, it was easy for William to get himself appointed as his successor. Proposals were made for electing a regent. Others were for investing the prince of Orange with regal power, and declaring the young prince supposititious. To these proposals, however, William opposed the following decisive argument, viz. that "he had been called over to defend the liberties of the British nation, and that he had happily effected his purpose; that he had heard of several schemes proposed for the establishing of the government; that if they chose a regent, he thought it incumbent upon him to inform them that he would not be that regent; that he would not accept of the crown under the prince's wife, though he was convinced of her merits: that therefore, if either of these schemes was adopted, he could give them no assistance in the settlement of the nation; but would return home to his own country, satisfied with his aims to secure the freedom of theirs." Upon this, after a long debate in both houses, a new sovereign was preferred to a regent by a majority of two voices. It was agreed that the prince and prince of Orange should reign jointly as king and queen of Britain; while the administration of government should be placed in the hands of the prince only. The marquis of Halifax, as speaker of the house of lords, made a solemn tender of the crown to their Highnesses, in the name of the peers and commons of Britain. The prince accepted the offer; and that very day, February 13th 1689, William and Mary were proclaimed king and queen of Great Britain.

Though Mary was comprehended in the royal title, she never possessed either the authority of a queen, or the influence of a wife. Her easy temper had long been subdued by the stern severity of a husband who had very few amiable qualities. Being brought up in a manner under the tuition of her spouse, and in some degree confined by his orders, she was accustomed to adopt implicitly his political maxims and even his thoughts; and in consequence of her want of importance with him, she ceased to be an object of consequence in the eyes of the nation.

William began his reign with issuing a proclamation for continuing in office all Protestants that had been in place on the first of the preceding December. On the 17th of the month he formed his privy council, which consisted chiefly of such persons as had been most active in raising him to the throne. To gratify as many as possible of his friends, the several boards, and

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301
The throne
declared va-
cant.

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William
raised to the
sovereignty.

298
Isis press'd a
o' stay in the
kingdom:

299
But refuses

300
The lands in
France.

Britain.

Britain.

even the chancery, were put into commission. The benches of the exchequer and common law were filled with persons who had distinguished themselves against the measures of the late king. The earl of Nottingham who had violently opposed the elevation of William, and the earl of Shrewsbury who had adhered to his views, were made secretaries of state. The marquiss of Halifax, and the earl of Danby, though rivals in policy, were admitted into the cabinet; the first as lord privy seal, the second as president of the council. His Dutch friends in the mean time were not forgotten by the king. Bentinck, his favourite, was made a privy counsellor, groom of the stole, and privy purse. Auverquerque was appointed master of the horse. Zuylstein received the office of master of the robes. Schomberg was placed at the head of the ordnance.

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National
discontents.

Though these instances of gratitude were no doubt necessary to William, the generality of the nation were displeased. The Tories were offended at being excluded from his favour, especially as they had departed from their principles in order to serve him. The nation in general were much prejudiced against foreigners, and universal discontent ensued upon seeing them preferred. The king, who had been bred a Calvinist, was also very strongly inclined to favour that sect; and his prejudices in favour of Calvinism were almost equal to those of James in favour of Popery. Finding, therefore, the clergy of the church of England little inclined to take the oaths to the new government, he began openly to indulge his own prejudices in favour of dissenters. Having come to the house of lords to pass some bills, on the 16th of March, he made a speech, urging the necessity of admitting all Protestants indiscriminately into the public service. He told his parliament, that he had something to communicate, which would conduce as much to their settlement as to the disappointment of their enemies. He informed them, that he was employed in filling up the vacancies in offices of trust; and he hoped that they were sensible of the necessity of a law to settle the oaths to be taken by such persons as should be admitted into place. As he doubted not, he said, that they would sufficiently provide against Papists, so he hoped that they would leave room for the admission of all Protestants that were able and willing to serve.

304
His scheme
in favour of
dissenters
rejected.

This proposition was rejected with vehemence. The adherents of the church complained that the ruin which they feared from the Papists in the preceding reign was now to be dreaded from the Protestant dissenters. They affirmed, that if the established religion was to be destroyed, it mattered little by whose hands it must fall. A bill brought in by the ministry for abrogating the former oaths of supremacy and allegiance was rejected.

An attempt to dispense with the sacramental test was made without success in another form. The court party proposed that any man should be sufficiently qualified for an office by producing a certificate of his having received the sacrament in any Protestant congregation. But this motion was also rejected in the house of lords by a great majority. William repeated his attempts of a comprehension; but he was ultimately unsuccessful, and in the coronation-oath the church-party inserted a clause highly favourable to themselves, viz. that the king should maintain the Protestant reli-

gion "as established by law." To this clause William is said to have discovered an apparent unwillingness to swear.

For these and other reasons the government of William was for some time but in a very tottering condition. The king, either through want of health or inclination, interfered but little in the affairs of the nation. Ireland was strangely neglected. Halifax and Danby, who had in a manner raised the king to the throne, caballed with his enemies. They perceived that the people, with the same levity that induced them to desert their former sovereign, were beginning to be discontented with their new prince. Every thing seemed to tend to a change. Halifax himself declared, that were James to conform with the Protestants, he could not be kept four months from reascending his throne. Danby avowed, that, were the late king to give satisfaction for the security of religion, it would be difficult to oppose his restoration. From these apparent discontents of the nation, the friends and emissaries of James assumed more boldness. They tampered with the servants of the crown, and inflamed the army. The former they alarmed with the prospect of a sudden change; the latter they roused into indignation by the manifest preference given by William to his countrymen the Dutch.

305
Tottering
condition of
William's
government

Though the kingdom of Scotland did not at first recognize the authority of William, yet the party of James never attained sufficient strength to be of any effectual service to him in that kingdom. Thirty Scots peers, and near 80 gentlemen, then in London, had waited in the beginning of January on the prince of Orange. Without any authority from the regency still subsisting in Edinburgh, they formed themselves into a kind of convention. The prince of Orange in a formal manner asked their advice. He withdrew, and they adjourned to the council-chamber at Whitehall. The duke of Hamilton being chosen president, explained the distracted state of Scotland. He represented, that disorders, anarchy, and confusion, prevailed; and he urged the necessity of placing the power somewhere till a convention of states should be called to form a lasting and solid settlement. When the heads of their address to the prince of Orange were settled, and ordered to be engrossed, the earl of Arran unexpectedly arose, and proposed to invite back the king. The meeting, however, adhered to the prince of Orange; and waited on him in a body, requesting him to take the administration into his hands. He thanked them for the trust they had reposed in him; and a convention was ordered to meet at Edinburgh on the 14th of March, and it was provided that no exception or limitation whatever should be made, except that the members should be Protestants.

306
He is ac-
knowledged
king in
Scotland.

A secession, however, was made from this convention, in favour of James. The archbishop of Glasgow, the earl of Balcarra, and the viscount Dundee, were authorized by an instrument signed by the late king, at that time in Ireland, to call a convention of the states at Stirling. But this measure was disappointed, first by the wavering disposition of the marquiss of Athol, and afterwards by the delay and folly of the party. At last, the viscount Dundee, being alarmed by an information of a design formed by the covenanters to assassinate him, left Edinburgh at the head of

Britain.

50 horse. When he passed under the walls of the castle, the duke of Gordon who held that place, and favoured the cause of James, called him to a conference. He scrambled up the precipice, and informed the duke of his designs in favour of the late king. He conjured him to hold out the cattle, under a certainty of being relieved. The novelty of the sight collected multitudes of spectators. The convention were alarmed. The president ordered the doors to be locked, and the keys to be laid upon the table. The drums were beat to alarm in the town. A parcel of ill-armed retainers were gathered together in the street by the earl of Leven. Dundee in the mean time rode off with his party. But when they found themselves secure, the duke of Hamilton adjourned the convention, which relieved the adherents of James from dreadful apprehensions for their own safety. Fifty members retired from Edinburgh; and that circumstance procured an unanimity in all the succeeding resolutions of the convention. Soon after this it was determined in a committee, that James had *forfeited* his right to the crown, by which was meant that he had perpetually excluded himself and his whole race from the crown, which was thereby become vacant. This resolution was approved by the convention, and another was drawn up for raising William and Mary to the vacant throne; in consequence of which they were proclaimed at Edinburgh on the 11th of April 1689.

The castle of Edinburgh was still kept, in the name of James, by the duke of Gordon; but despairing of any relief, and pressed by a siege, he surrendered it on the 13th of June, upon honourable terms. The adherents of James, terrified with this unexpected misfortune, now turned their eyes to the viscount Dundee. That nobleman having been in vain urged by the convention to return, they had declared him a fugitive, an outlaw, and a rebel. General Mackay had been sent to Scotland by William with four regiments of foot, and one of dragons; and Dundee being apprised of his design to surprize him, retired to the Grampian mountains with a few horse. He marched from thence to Gordon castle, where he was joined by the earl of Dunfermline with 50 gentlemen. He then passed through the county of Murray to Inverness. Macdonald of Keppoch lay with 700 men before that town; after having ravaged in his way from his own country the lands of the clan of Macintosh. Dundee, having promised to the magistrates of Inverness to repay, at the king's return, the money extorted from them by Macdonald, induced the latter to join him with all his men. He could not prevent them, however, from first returning home with their spoil. He accompanied them to Lochaber, and on the 8th of May arrived in Badenoch. From thence he wrote letters to the chiefs of all the clans, appointing them to meet at a general rendezvous in Lochaber, on the 18th of the same month. In the mean time, passing suddenly through Athol, he surprized the town of Perth. In hopes of gaining to his party the two troops of Scots dragoons, who lay at Dundee, he marched suddenly to that place: but the fidelity of captain Balfour, who commanded them, disappointed his views. Having raised the land-tax as he passed, Dundee returned through Athol and Rannoch to hold the diet of rendezvous at Lochaber. Here he was reinforced by several Highland chieftains,

so that his army amounted to 1500 men. He pursued Mackay for four days, who had advanced to Inverness, but afterwards retreated to Strathbogie, leaving the whole Highlands exposed to the enemy.

Soon after, however, Dundee found himself surrounded with many difficulties. The officers of the Scots dragoons, who held a secret correspondence with him, wrote him false intelligence, as an excuse for their own fears. They informed him that a party of Irish, who had endeavoured to land in Scotland, under the duke of Berwick, were driven back, and the duke himself taken prisoner; and that Mackay had been reinforced with a regiment of English horse, and another of foot. On this intelligence, Dundee retreated to Badenoch. The natives of the low country who served in his army quitted him without leave; and the Highlanders plundered the country wherever they came; at last he himself fell sick, while Mackay hovered on his rear. A slight skirmish happened, in which the Highlanders prevailed; but they lost their baggage during the action. Dundee at length arrived at Ruthven; but Mackay being reinforced with a body of 1200 men advanced against him, and other regiments had arrived at Perth and Dunblain. The Highlanders now deserted every night by hundreds; their gallant leader himself was forced to retire to Lochaber, where only 200 of his whole force remained with him; and, to complete his misfortunes, he received at the same time news of the surrender of the castle of Edinburgh.

On the 23^d of June, letters arrived from king James, with a promise of immediate succours from Ireland; upon which Dundee ordered the neighbouring clans to assemble round his standard. But still he had scarce anything but the mere bodies of his men with which he could prosecute the war. The Highlanders were armed only with their own proper weapons, and he had no more than 40 pounds of powder in his whole army. All difficulties, however, were surmounted by the active spirit of the general, for whom the army entertained an enthusiastic zeal. On the 17th of July, he met the king's forces under general Mackay, near the pass of Killicranky. An engagement ensued, in which the Highlanders were victorious. Two thousand of Mackay's men were lost either in the field or in the pursuit; but the victory cost the Highlanders very dear, for their brave general was mortally wounded. He survived the battle, however; and wrote an account of the victory to king James: he even imagined his wound was not mortal; but he died the next morning at Blair. With him ended all the hopes of James in Scotland. Colonel Cannon, who succeeded Dundee in the command, possessed neither his popularity nor his abilities. After some insignificant actions, in which the valour of the soldiers was more conspicuous than the conduct of their leader, the Highlanders dispersed themselves in disgust; and the war soon after ended favourably for William, without any repulse given to his enemies.

During the troubles in England, which had terminated in placing William on the throne, the two parties in Ireland were kept in a kind of tranquillity by their mutual fears. The Protestants were terrified at the prospect of another massacre; and the Papists expected every day to be invaded by the joint force of the English and Dutch. Their terrors, however, were ill founded; for though Tyrconnel sent several messages

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327
Attempts of
Dundee in fa-
vour of
James.

308
He is slain at
Killicranky.

309
Ireland ne-
ver restored by
William.

Britain.

to the prince, that he was ready to deliver up the kingdom to any force that might make a surrender decent, his offers were always rejected. William was persuaded by the marquis of Halifax, that, should Ireland yield, no pretence could remain for keeping an army in pay; that then, having no army to protect his authority, he might as easily be turned out as he had been brought in; that the English nation could never remain long in a state of good humour; and that he might perceive they already began to be discontented. These insidious arguments induced William to neglect Ireland in such a manner as is justly looked upon to be one of the greatest blemishes in his whole reign. His enemies, indeed, though perhaps without any good foundation, assign a worse cause; viz. that should England be confirmed under his government, Ireland could not long hold out; and that the obstinacy of his Irish enemies would give a pretence for forfeitures to gratify his English, but especially his foreign, friends.

320
An insurrec-
tion in
favour of
James.

Tyrconnel, disappointed in his views of surrendering Ireland to the prince of Orange, affected to adhere to James. The whole military force of the kingdom at that time amounted only to 4000 men, and of these only 600 were in Dublin; and what was still worse, all of them were so much disposed to quit the service, that the lord deputy was obliged to issue commissions for levying new forces. Upon this, an half-armed rabble, rather than army, rose suddenly in various parts of the kingdom. Having no pay from the king, they subsisted by depredation, and regarded no discipline. The Protestants in the north armed themselves in their own defence; and the city of Londonderry, relying on its situation, and a slight wall, shut its gates against the new-raised army. Protestant parties in the mean time rose every where, declaring their resolution to unite in self-defence, to preserve the Protestant religion, to continue their dependence on England, and to promote the meeting of a free parliament.

321
Protestants
take arms in
their own
defence.

To preserve appearances, William now sent general Hamilton, an Irishman and a Roman-catholic, to treat with Tyrconnel; but instead of persuading that lord to yield to William, this messenger advised him to adhere to James. In the mean time James himself assured the lord deputy, that he was ready to sail from Breff with a powerful armament. Hamilton, assuming spirit from the hopes of this aid, marched against the northern insurgents. They were routed with considerable slaughter at Drumore; and Hillsborough, where they had fixed their head-quarters, was taken without resistance: the city of Londonderry, however, refused to hold out to the last extremity.

322
They
were
defeated at
Drumore.

On the 7th of March 1689, James embarked at Breff. The whole force of his expedition consisted of 14 ships of war, 6 frigates, and three fire-ships. Twelve hundred of his native subjects in the pay of France, and 700 French officers, composed the whole army of James. He landed at Kinsale without opposition on the 12th of the month, where he was received with the utmost demonstrations of joy. His first care was to secure in the fort of Kinsale, the money, arms, and ammunition, which he brought from France; and put the town in some posture of defence: which having done, he advanced to Corke. Tyrconnel arrived at this place soon after, and brought intelligence of the route at Drumore. The king was so much pleased with his attach-

323
James I
lands
in Ireland.

ment and services, that he created him a duke; after which, he himself advanced towards Dublin. The condition of the rabble, who poured round him under the name of an *army*, was not calculated to raise his hopes of success. The most of them were only provided with clubs; some had sticks tipped with iron; and even of those who were best armed, scarce two in a hundred had muskets fit for service. Their very numbers distressed their sovereign, and ruined the country; inasmuch that James resolved to disband the greatest part of them. More than 100,000 were already on foot in the different parts of the island. Of these he reserved 14 regiments of horse and dragoons, and 35 regiments of foot; the rest he ordered to their respective homes, and armed those that were retained in the best manner he could.

Being received at Dublin with an appearance of universal joy, James proceeded immediately to business. He ordered by proclamation all Protestants who had abandoned the kingdom to return. He commanded in a second proclamation, all Papists, except those in his army, to lay up their arms, and put an end to the robberies and depredations which they had committed in the violence of their zeal. He raised the value of the currency by a proclamation; and he summoned a parliament to meet on the 7th of May, to settle the affairs of the kingdom. The Protestant clergy represented their grievances in an address; and the university of Dublin appeared with complaints and congratulations. He assured the first of his absolute protection, and a full redress; and he promised the latter not only to defend, but even to enlarge, their privileges.

On the 8th of April, James left Dublin, resolving to lead his army against the insurgents in person. They retired before him, and the king laid siege to Londonderry. The besieged made such a vigorous resistance as has made the place remarkable ever since: but being reduced to the last extremity, they have been obliged to surrender, had not they been relieved on the 28th of July, by seven ships laden with provisions; upon which, the siege was immediately raised.

324
Is forced to
raise the
siege of
Londonderry.
+ See Londonderry.

In the mean time, the distressed situation of James, and his absolute dependence upon France, drove him into measures which otherwise he would never have thought of. His soldiers for some time had been supported by their officers, or subsisted by depredation. The funds of the officers were at last exhausted, and the country itself could no longer bear the riot and injustice of the soldiers. Pressed by these difficulties, James, by the advice of his council, resolved to coin pieces of copper, which should be received for silver. He saw well enough the inconveniencies of this measure; but all Ireland possessed not the means of paying the army, in current coin, to the middle of June. Of the French remittances only 200,000 livres remained; and the king found it absolutely necessary to reserve that sum, to forward his measures with regard to Britain, and to procure intelligence of the motions of his enemies. The army was satisfied even with this appearance of money, and the people received the fictitious coin in hopes of being repaid in a more favourable state of affairs. A tax of 20,000*l.* a month, granted for 13 months by the parliament, furnished government with an appearance of resources; and in the mean time the king endeavoured to support the former revenue. He opened

325
Is driven in-
to disagree-
able mea-
sures.

Britain.

opened a trade with France to supply the want of commerce with England. But the French, knowing their own importance, and the necessity of the unfortunate monarch's affairs, claimed and obtained advantages in traffic, which offended his own subjects.

To add to the distress of James, Ireland was now invaded by 10,000 men under the command of the duke of Schomberg. They appeared on the 12th of August 1689, in 90 transports, on the coast of Donaghadee, in the county of Down. Next day Schomberg landed without opposition his army, horses, and train of artillery. Having marched to Belfast on the 15th, he continued in that place four days to refresh his troops. He invested Carrickfergus, and threw into it 1000 bombs, which laid the houses in ashes. The garrison having expended their powder to the last barrel, marched out with all the honours of war. But Schomberg's soldiers broke the capitulation. They disarmed and stripped the inhabitants, without any regard to sex or quality; even women, stark naked, were publicly whipped between the lines; and all this under pretence of cruelties of the same kind having been committed by the Papists.

Though Schomberg was an experienced general, who had passed a life of 80 years almost continually in the field, he found himself at a loss how to carry on the war in Ireland. He did not consider the dangers that threatened the health of his troops by confining them too long in one place; and he kept them in a low moist camp near Dundalk, almost without firing of any kind; so that the men fell into fevers and fluxes, and died in great numbers. The enemy were not less afflicted with similar disorders. Both camps remained for some time in sight of each other; and at last, the rainy season approaching, both armies quitted their camps at the same time, and retired into winter quarters.

The bad success of the campaign, and the miserable situation of the Protestants in Ireland, at length induced William to attempt their relief in person. Accordingly he left London on the 4th of June 1690, and arrived at Carrickfergus on the 14th of that month. From thence he passed to Lisburn, the head quarters of the duke of Schomberg. He reviewed at Lough-Britland his army, which consisted of 36,000 men, and was composed of English, Dutch, Germans, Danes, and French. Being supplied with every necessary, and in high health and spirits, they seemed absolutely certain of victory. The Irish army, having abandoned Ardee at their approach, fell back to the south of the Boyne. On the banks of that river they were joined by James, who had marched from Dublin at the head of his French auxiliaries. The banks of the Boyne were steep; the south side hilly, and fortified with ditches. The river itself was deep, and it rose very high with the tide. These advantages induced James, contrary to the opinion of his officers, to keep possession of this post. His army was inferior in numbers, discipline, and every thing, to his enemies: but flight, he thought, would dispirit his troops, and tarnish his own reputation; he therefore resolved to put the fate of Ireland on the issue of a battle. Urged by his friends in England, and encouraged by a projected invasion of that kingdom by France, he had resolved to quit Ireland; and to this he was farther encouraged by the assurance of aid from a powerful fleet that had already entered the narrow seas. But the

strength of his situation, and the sudden appearance of the enemy, which made even a retreat dangerous, induced him to defer his purpose.

William was no sooner arrived, than he rode along the river's side, in sight of both armies, to make proper observations on the plan of battle; but in the mean time, being perceived by the enemy, a cannon was privately brought out and planted against him where he was sitting. The shot killed several of his followers, and he himself was wounded in the shoulder. The news of his being slain was instantly propagated thro' the Irish camp, and even sent off to Paris; but William, as soon as his wound was dressed, rode through the camp, and quickly undeceived his army.

The next morning, (June 30th), the battle began at six in the morning. James's forces behaved with great resolution, but were at last defeated with the loss of 1500 men. The Protestants lost but about one third of that number; but among these was their brave general the duke of Schomberg. He was killed by a discharge from his own troops, who, not knowing that he had been accidentally hurried into the midst of the enemy, fired upon the body of men who surrounded him. During the action, James stood on the hill of Dunmore, surrounded with some squadrons of horse; and at intervals was heard to exclaim, when he saw his own troops repulsing those of the enemy, "O spare my English subjects!" While his troops were yet fighting, he quitted his station; and leaving orders to guard the pass at Duleek, made the best of his way to Dublin. He advised the magistrates of that city to make the best terms they could with the victors; and he himself set out for Waterford, where he immediately embarked for France. When he first deserted his troops at the Boyne, O'Regan, an old Irish captain, was heard to say, "That if the English would exchange generals, the conquered army would fight them over again."

The victory at the Boyne was by no means decisive, and the friends of James resolved to continue their opposition to William. Sarsfield, a popular and experienced general, put himself at the head of the army that had been routed at the Boyne, and went farther into the country to defend the banks of the river Shannon. James appointed one St Ruth to command over Sarsfield, which gave the Irish universal discontent. On the other hand, general Ginckle, who had been appointed to command the English army in the absence of William, who was gone over to England, advanced towards the Shannon to meet the enemy. The only place where it was fordable was at Athlone, a strong walled town built on both sides of the river, and in the hands of king James's party. The English soon made themselves masters of that part which was on the hither side of the river; but the part on the opposite bank being defended with great vigour, was for a long while thought impregnable. At length it was resolved in a council of war, that a body of forlorn hope should ford the stream in the face of the enemy; and this desperate enterprize was performed with great resolution; the enemy were driven from their works, and the town surrendered at discretion. St Ruth marched his army to its relief, but he came too late; for he no sooner approached, than his own guns were turned against him: upon which he instantly marched off and took post at Aughrim, at ten miles distance, where he determined

to

316
Ireland in-
duced by
William's
my;

317
and by
William in
person.

318
Battle at the
Boyne.

Britain.

319
William in
danger.

320
James de-
feated.

321
He flies to
France.

322
War conti-
nued in his
absence.

333
St Ruth,
James's ge-
neral, de-
feated and
killed.

to wait the English army. Ginckle did not decline the combat, though he had only 18,000 men, while the Irish were above 25,000 strong. A desperate engagement ensued; but at last St Ruth being killed, his troops gave way on all sides, and retreated to Limeric, where they determined to make a final stand, after having lost nearly 5000 of their best men.

334
Limeric be-
sieged.

Ginckle, wishing to put an end to the war at once, suffered as many of the Irish as chose, to retire to Limeric. In this last retreat the Irish forces made a brave defence. The siege commenced August 25th 1691. Six weeks were spent before the place without any decisive effect. The garrison was well supplied with provisions, and provided with all means of defence. The winter was approaching, and Ginckle had orders to finish the war upon any terms. He therefore offered such conditions as the Irish, had they been victors, could scarce have refused with prudence. He agreed, that all in arms should receive their pardon: that their estates should be restored, their attainders annulled, and their outlawries reversed: that none should be liable for debts incurred through deeds done in the course of hostilities: that all Roman-catholics should enjoy the same toleration with regard to their religion, as in the reign of Charles II.: that the gentry should be permitted to make use of arms: that the inferior foot should be allowed to exercise their callings and professions: that no oaths but that of allegiance should be required of high or low: that should the troops, or any number of them, choose to retire into any foreign service, they should be conveyed to the continent, at the expence of the king: Sarsheld, who had obtained the title of *earl of Lucan* from James after his abdication, was permitted to retain a dignity which the laws could not recognise. The lords justices had arrived from Dublin on the first of October. They signed the articles together with Ginckle; and thus the Irish Papists put a happy period to a war which threatened their party with absolute ruin. In consequence of this treaty, about 14,000 of those who had fought for king James went over to France, having transports provided by government for conveying them thither. When they arrived, James thanked them for their loyalty, and told them that they should still fight for their old master; and that he had obtained an order from the king of France, for their being new clothed, and put into quarters of refreshment. In this manner all James's expectations from Ireland were entirely frustrated, and the kingdom submitted quietly to the English government.

336
Massacre at
Glenco.

In the beginning of the year 1692, an action of unexampled barbarity disgraced the government of William in Scotland. In the preceding August, in consequence of a pacification with the Highlanders, a proclamation of indemnity had been issued to such insurgents as should take the oaths to the king and queen, on or before the last day of December. The chiefs of the few tribes who had been in arms for James complied soon after with the proclamation: but Macdonald of Glenco failed in submitting within the limited time; more, however, from accident than design. In the end of December, he came to colonel Hill, who commanded the garrison in fort William, to take the oaths of allegiance to the government. Hill, having furnished Macdonald with a letter to Sir Colin Campbell, sheriff of the county of Argyle, directed him to repair immediately to

Inverary, to make his submission in a legal manner before that magistrate. The way to Inverary lay through almost impassable mountains; the season was extremely rigorous, and the whole country covered with a deep snow. So eager, however, was Macdonald to take the oaths, before the limited time should expire, that, tho' the road lay within half a mile of his own house, he would not stop to visit his family. After various obstructions, he arrived at Inverary. The time was elapsed, and the sheriff hesitated to receive his submission; but Macdonald prevailed on him by his importunities, and even tears. Sir John Dalrymple, afterwards earl of Stair, attended king William as secretary of state for Scotland. He took advantage of Macdonald's neglecting to take the oaths within the time prescribed, and procured from the king a warrant of military execution against him and his whole tribe. As a mark of his own eagerness, or to save Dalrymple, William signed the warrant, both above and below, with his own hand. The secretary, in letters expressive of a brutal ferocity of mind, urged the officers who commanded in the Highlands to execute their orders with the utmost rigour. Campbell of Glenlyon, a captain in Argyle's regiment, and two subalterns, were ordered, with 120 men, to repair to Glenco on the first of February. Campbell, being uncle to young Macdonald's wife, was received by the father with all manner of friendship and hospitality. The men were treated in the houses of his tenants with free quarters and kind entertainment. Till the 13th of the month, the troops lived in good humour and familiarity with the people. The officers, on the very night of the massacre, passed the evening and played at cards in Macdonald's house. In the night, lieutenant Lindsay, with a party of soldiers, called in a friendly manner at his door. He was instantly admitted. Macdonald, as he was rising to receive his guest, was shot dead behind his back, with two bullets. His wife had already put on her clothes; but he was stripped naked by the soldiers, who tore the rings off her fingers with their teeth. The slaughter was become general. To prevent the pity of the soldiers to their hosts, their quarters had been changed the night before. Neither age nor infirmity was spared. Some women, in defending their children, were killed. Boys, imploring mercy, were shot by officers, on whose knees they hung. In one place, nine persons, as they sat enjoying themselves at table, were shot dead by the soldiers. At Inveriggen, in Campbell's own quarters, nine men were first bound by the soldiers, and then shot at intervals, one by one. Near 40 persons were massacred by the troops. Several, who fled to the mountains, perished by famine and the inclemency of the season. Those who escaped owed their lives to a tempestuous night. Lieutenant colonel Hamilton, who had the charge of the execution from Dalrymple, was on his march with 400 men, to guard all the passes from the valley of Glenco; but was obliged to stop by the severity of the weather, which proved the safety of the unfortunate tribe. He entered the valley next day; laid all the houses in ashes; and carried away all the cattle and spoil, which were divided among the officers and soldiers.

The entire reduction of Ireland, and the dispersion and extermination of the Highland chieftains who favoured his cause, did not entirely put an end to the hopes

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Plots in fa-
vour of
James.

hopes of James. His chief expectations next were founded on a conspiracy among his English adherents, and in the succours promised him by the French king. A plot was first formed in Scotland by Sir James Montgomery; a person who, from being an adherent to William, now turned against him: but as the project was ill contrived, so it was as lightly discovered by the instigator. To this another succeeded, which seemed to threaten more serious consequences, as it was managed by the whig party, who were the most formidable in the state. A number of these joined themselves to the tories, and both made advances to the adherents of the late king. They assembled together; and the result of their deliberations was, that the restoration of James was to be effected entirely by foreign forces: that he should sail for Scotland, and be there joined by 5000 Swedes; who, because they were of the Protestant religion, would, it was thought, remove a part of the odium which attended an invasion by foreigners: it was concerted that assistance should at the same time be sent from France, and that full liberty of conscience should be proclaimed throughout the kingdom. In order to lose no time, it was resolved to send over to France two trusty persons to consult with the banished monarch; and lord Preston and Mr Ashton were the two persons appointed for this embassy. Both of them, however, were seized when they least expected it, by order of lord Carmarthen. Both were condemned, and Ashton was executed without making any confession; but lord Preston had not the same resolution. Upon an offer of pardon, he discovered a great number of associates; among whom the duke of Ormond, lord Dartmouth, and lord Clarendon, were foremost.

329
He is sup-
ported by
the French.

The French at last became sensible of their bad policy in not having better supported the cause of James, and therefore resolved to make a descent upon England in his favour. In pursuance of this scheme, the French king supplied James with an army consisting of a body of French troops, some English and Scots refugees, and the Irish regiments, which had been transported into France from Limerick, and were now become excellent soldiers by long discipline and severe duty. This army was assembled between Cherbourg and La Hogue, and commanded by king James in person. More than 300 transports were provided for landing it on the opposite coast; and Tourville, the French admiral, at the head of 63 ships of the line, was appointed to favour the descent. His orders were, at all events, to attack the enemy, in case they should oppose him; so that every thing promised the banished king a change of fortune.

These preparations on the side of France were soon known at the English court, and every precaution taken for a vigorous opposition. All the secret machinations of the banished king's adherents were discovered to the English ministry by spies; and by these they found that the tories were more faithful than even the whigs who had placed king William on the throne. The duke of Marlborough, lord Godolphin, and even the prince of Anne herself, were violently suspected of disaffection. Preparations, however, were made, with great tranquillity and resolution, to resist the growing storm. Admiral Russel was ordered to put to sea with all possible expedition; and he soon appeared with 99

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are de-
fected.

ships of the line, besides frigates and fire-ships. At the head of this formidable fleet he set sail for the coast of France; and, near La Hogue, he discovered the enemy under Tourville, who prepared to give him battle. The engagement began between the two admirals with great fury, and the rest of the fleet soon followed their example. The battle lasted for ten hours; but at last victory declared on the side of numbers: the French fled for Conquet road, having lost four ships in the first day's action. The pursuit continued for two days following: three French ships of the line were destroyed the next day; and 18 more, which had taken refuge in the bay of La Hogue, were burned by Sir George Rooke. In this manner were all the French preparations frustrated; and so decisive was the blow, that from this time France seemed to relinquish all claims to the ocean.

This engagement, which happened on the 21st of May 1692, put a final period to the hopes of James. No further attempts were made in his favour, except some plots to assassinate king William, which ended only in the destruction of those who formed them. But it was never thoroughly proved that James countenanced these plots in the least; it rather appears, that in all cases he expressed the utmost abhorrence of such attempts. In 1697, the abbe de Polignac, ambassador from France in Poland, wrote to his master, that several thoughts were entertained of the late king of Britain, in the new election which happened on the death of John Sobieski king of Poland; and that James had been already named by some of the diets as his successor. Lewis was eager to seize an opportunity of ridding himself with honour of a prince whose pretensions he could no longer support. The friends of which he refused, James were also sanguine for the project; but he himself refused it. He told them, that "he would ever retain a grateful remembrance of his friends in Poland. That, however, he would not accept of the crown, had it actually been offered; much less would he endeavour to obtain by solicitation any crown which was not actually his due. That his acceptance of any other sceptre would amount to an abdication indeed of that which he deemed his right. That therefore he was resolved to remain in his present forlorn condition, possessing less hopes than ever of being restored, rather than to do the least act of prejudice to his family." The same year, at an interview between king William and Lewis XIV. it was proposed that the prince of Wales (James's son) should succeed to the throne of England after the death of William. The king with little hesitation agreed to this request. He even solemnly engaged to procure the repeal of the act of settlement; and to declare by another, the prince of Wales his successor to the throne. Even this proposal was rejected by James. He told the king of France, that though he could suffer with patience the usurpation of his nephew upon his right, he would never permit his own son to be guilty of the same injustice. He urged, that should the son reign in his father's lifetime, that circumstance would amount to a formal renunciation. That the prince of Wales by succeeding to the prince of Orange, would yield his sole right, which was that of his father, &c.

330
James of
crown of
Poland.

331
Which he
refuses.

332
William en-
gages to crown
James's son
for his own
successor.

333
Which
James re-
fuses.

From this time James lost every hope of being re-
stored to the throne, and resigned himself entirely to

334
His death.

Britain.

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the austerities of religious enthusiasm. His constitution, though vigorous and athletic, had for some time begun to yield to the infirmities of age, and to that melancholy which superstition as well as his uncommon misfortunes had impressed on his mind. In the beginning of September 1701, when he was, according to his daily custom, at public prayers, he fell suddenly into a lethargy; and though he recovered his senses soon after, he languished for some days, and expired on the 6th of September. The French king, with great humanity, paid him several visits during his sickness; and exhibited every symptom of compassion, affection, and even respect.

Lewis, being under a difficulty how to proceed upon the expected death of James, called a council to take their advice, whether he should own the prince of Wales as king of Great Britain and Ireland. The king himself had hesitated long on this delicate point. But the dauphin, the duke of Burgundy, and all the princes of the blood, declared, that it was becoming the dignity of the crown of France not to own that the titles of the father devolved immediately upon the son. Lewis approved of this resolution, and determined to acquit the dying king with it in person. When he arrived at St Germain's, he acquainted first the queen, and then her son, of his design. He then approached the bed in which James lay almost insensible with his disorder. The king, rousing himself, began to thank his most Christian majesty for all his favours; but Lewis interrupted him. "Sir (said he), what I have done is but a small matter; but what I have to say is of the utmost importance." The people then began to retire. "Let no person withdraw (said Lewis). I come to acquaint you, Sir, that when God shall please to call your majesty from this world, I shall take your family into my protection, and acknowledge your son, as he then will certainly be, king of Great Britain and Ireland."

Though the defeat of the French fleet at La Hogue had put king William out of all danger from any further attempts from that quarter, he by no means possessed his throne with any kind of tranquillity. The want of a common enemy produced dissensions among the people, and William began to find as much uneasiness from his parliament at home as from an enemy in the field. The uneasiness he felt from the refractory disposition of his subjects was not a little heightened by the death of his queen, who was taken off by the small-pox on the 28th of December 1694. For some time he was under a sincere concern for her loss; but as politics had taken entire possession of his mind, he lost all other concerns in the greatness of his apprehensions for the balance of power and the fluctuating interests of Europe.

His chief motive for accepting the crown was to engage England more deeply in the concerns of Europe. His great object had been to humble the French, and all his politics consisted in forming alliances against them. On the other hand, many of the English had no such animosity against the French; and these, therefore, considered the interest of the nation as sacrificed to foreign connexions; and complained that the continental war fell most heavily on them, though they had the least interest in its success. These complaints were heard by William with the most phlegmatic indifference; he employed all his attention only on the balance of power,

and the interests of Europe. He became unmindful of the cultivation of internal polity; and, as he formed alliances abroad, increased the influence of party at home. Patriotism began to be ridiculed as an ideal virtue; and the practice of bribing a majority in parliament became universal. The example of the great was caught up by the vulgar; principle, and even decency, was gradually banished; talents lay uncultivated, and the ignorant and profligate were received into favour.

The king, upon accepting the crown, was resolved to preserve as much of the prerogative as possible; and he sometimes exerted a branch of it which his predecessors had never chosen to make use of, viz. the power of refusing his assent to some bills that had passed both houses. From this and other causes there were perpetual bickerings between him and his parliaments. At last William became fatigued with opposition. He admitted every restraint upon the prerogative in England, upon condition of being properly supplied with the means of humbling France. Provided the parliament supplied him with the means of executing this, he permitted them to rule the internal polity as they pleased. For the prosecution of the French war, the sums granted were indeed incredible. The nation, not contented with furnishing him such sums of money as they were capable of raising by the taxes of the year, mortgaged those taxes, and involved themselves in debts which they have never since been able to discharge.

The war with France continued during the greatest part of this king's reign; but at length the treaty of Ryfwick, in 1697, put an end to those contentions in which England had engaged without policy, and came off at last without advantage. In the general pacification, her interests seemed entirely deserted; and for all the treasures she had sent to the continent, and all the blood which had been shed there, the only equivalent received was an acknowledgement of William's title from the king of France.

The king, being now freed from a foreign war, set himself to strengthen his authority at home. As he could not bear the thoughts of being a king without military command, he conceived hopes of keeping up, in the time of a profound peace, those forces which had been granted during the time of danger. The commons, however, to his great mortification, passed a vote, that all the forces in the English pay, exceeding 7000 men, should be forthwith disbanded; and that those retained should be natural-born subjects of England. With this vote the king was exceedingly displeased. His indignation, indeed, was kindled to such a degree, that he actually conceived a design of abandoning the government. From this, however, his ministers diverted him, and persuaded him to consent to the passing of the bill.

These altercations continued during the remainder of this reign. William considered the commons as a body of men desirous of power for themselves, and consequently bent upon obstructing all his projects to secure the liberties of Europe. He seemed but little attached to any particular party in the house, all of whom he found at times deserted or opposed him. He therefore veered to whigs and Tories indiscriminately, as interest or the immediate exigence demanded. He considered England as a place of labour, anxiety, and altercation. If he had any time for amusement or relaxation,

335
Pretender
owned by
Lewis to be
the king of
Britain.

336
Death of
queen Mary.

337
National
discontent.

338
William ob-
liged to dis-
band his
forces.

Britain.

Britain.

laxation, he retired to Loo in Holland, where, among a few friends, he gave a loose to those coarse festivities which he alone was capable of relishing. Here he planned the different succession of the princes of Europe, and laboured to undermine the schemes and the power of Lewis his rival in politics and fame.

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He engages
Britain in a
confederacy
against
France.

But however feeble William's desire of other amusements might be, he could scarce live without being at variance with France. Peace had scarce been made with that nation, when he began to think of resources for carrying on a new war, and for infliting his English subjects in the confederacy against that nation. Several arts were used for inducing the people to second his aims; and the whole nation seemed at last to join in desiring a French war. He had been in Holland concerting with his allies operations for a new campaign. He had engaged in a negotiation with the prince of Hesse; who assured him, that, if he would besiege and take Cadiz, the admiral of Castile and several other grandees of Spain would declare for the house of Austria. The elector of Hanover had resolved to concur in the same measures; the king of the Romans, and prince Lewis of Baden, undertook to invest Laudan, while the emperor promised to send a powerful reinforcement into Italy; but death put a period to his projects and his ambition.

340
His death.

William was naturally of a very feeble constitution; and it was by this time almost quite exhausted by a series of continual dissipation and action. He had endeavoured to repair his constitution, or at least to conceal its decays, by exercise and riding. On the 21st of February 1702, in riding to Hampton-court from Kensington, his horse fell under him; and he was thrown with such violence, that his collar-bone was fractured. His attendants conveyed him to the palace at Hampton-court, where the fracture was reduced; and in the evening he returned to Kensington in his coach. The jolting of the carriage disunited the fracture; and the bones were again replaced by Bidloo his physician. This, in a robust constitution, would have been a trifling misfortune; but to him it was fatal. For some time he appeared in a fair way of recovery; but falling asleep on his couch, he was seized with a shivering, which terminated in a fever and diarrhæa, that soon became dangerous and desperate. Perceiving his end approaching, the objects of his former care lay next his heart; and the fate of Europe seemed to remove the sensations he might be supposed to feel for his own. The earl of Albemarle arriving from Holland, he conferred with him in private on the posture of affairs abroad. Two days after, having received the sacrament from archbishop Tension, he expired, on Sunday March 8th; having lived 52 years, and reigned 13.—He was in his person of a middle stature, a thin body, and a delicate constitution. He had an aquiline nose, sparkling eyes, a large forehead, and a grave solemn aspect. He left behind him the character of a great politician, though he had never been popular; and of a formidable general, tho' he had been seldom victorious. His deportment was grave, phlegmatic, and fullen; nor did he ever show any fire but in the day of battle.

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Accession
of queen
Anne.

William was succeeded by the princess Anne, who had married George prince of Denmark. She ascended the throne in the 38th year of her age, to the general satisfaction of all parties. William had died at

the eve of a war with France; and the present queen, who generally took the advice of her ministry on every important occasion, was now urged by opposite councils; a part of her ministry being inclined to war, and another to peace. At the head of those who opposed a war with France was the earl of Rochester, lord lieutenant of Ireland, first cousin to the queen, and the chief of the tory faction. At the head of the opposite party was the earl afterwards duke of Marlborough, and since so much renowned for his victories over the French. After giving the reasons for both their opinions, that of Marlborough preponderated: the queen resolved to declare war; and communicating her intentions to the house of commons, by whom it was approved, war was proclaimed accordingly. In this declaration of war, Lewis was taxed with having taken possession of a great part of the Spanish dominions; with designing to invade the liberties of Europe, to obstruct the freedom of navigation and commerce; and with having offered an unpardonable insult to the queen and her throne by acknowledging the title of the pretender: he was accused of attempting to unite the crown of Spain to his own dominions by placing his grandson upon the throne of that kingdom, and thus of endeavouring to destroy the equality of power that subsisted among the states of Europe. This declaration of war on the part of England was seconded by similar declarations by the Dutch and Germans, all on the same day.

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War declar-
ed against
France.

Lewis XIV. whose power had been greatly circumscribed by William, expected, on the death of the latter, to enter on a field open for new conquests and fame. At the news of the English monarch's death, therefore, he could not suppress his rapture; the people of Paris, and indeed through the whole kingdom, testified their joy in the most public manner. At seeing, therefore, such a combination against him, the French monarch was filled with indignation; but his resentment fell chiefly on the Dutch. He declared with great emotion, that as for those gentlemen pedlars the Dutch, they should one day repent their insolence and presumption in declaring war against him whose power they had formerly felt and dreaded. By these threats, however, the affairs of the allies were no way influenced. Marlborough was appointed general of the British forces, and by the Dutch he was chosen generalissimo of the allied army; and indeed his after conduct showed, that no person could possibly have been chosen with greater propriety. He had learned the first rudiments of war under the famous marshal Turenne, having been a volunteer in his army; and by that general his future greatness was prognosticated.

343
Duke of
Marlbor-
ough ap-
pointed ge-
neral.

The first attempt that Marlborough made to deviate from the general practices of the army was to advance the subaltern officers, whose merits had been hitherto neglected. Regardless of seniority, wherever he found abilities, he was sure to promote them; and thus he had all the upper ranks of commanders rather remarkable for their skill and talents, than for their age and experience. In his first campaign, in the beginning of July 1702, he repaired to the camp at Nimegue, where he found himself at the head of 60,000 men well provided with all necessaries, and long disciplined by the best officers of the age. He was opposed on the part of France by the duke of Burgundy, a youth of

344
His success
in his first
campaign.

Britain.

very little experience in the art of war; but the real acting general was the marshal Boufflers, an officer of courage and activity. But wherever Marlborough advanced, the French were obliged to retire before him, leaving all Spanish Guelderland at his discretion. The duke of Burgundy finding himself obliged to retreat before the allied army, rather than expose himself longer to such a mortifying indignity, returned to Versailles, leaving Boufflers to command alone. Boufflers retired to Brabant; and Marlborough ended the campaign by taking the city of Liege; in which was found an immense sum of money, and a vast number of prisoners.

This good fortune seemed to console the nation for some unsuccessful expeditions at sea. Sir John Munden had permitted a French Squadron of 14 ships to escape him by taking shelter in the harbour of Corunna; for which he was dismissed the service by prince George. An attempt was made upon Cadiz by sea and land, Sir George Rooke commanding the navy, and the duke of Ormond the land forces; but this also miscarried. At Vigo, however, the British arms were attended with better success. The duke of Ormond landed with 2500 men at the distance of six miles from the city, while the fleet forcing their way into the harbour, the French fleet that had taken refuge there were burned by the enemy to prevent their falling into the hands of the English. Eight ships were thus burned and run ashore; but ten ships of war were taken, together with eleven galleons, and above a million of money in silver. In the West Indies, admiral Bembow had been stationed with ten ships to distress the enemy's trade. Being informed that Du Cassé the French admiral was in those seas with a force equal to his own, he resolved to attack him; and soon after discovered the enemy's squadron near St Martha, steering along the shore. He quickly gave orders to his captains, formed the line of battle, and the engagement began. He found, however, that the rest of the fleet had taken some disgust at his conduct; and they permitted him to sustain, almost alone, the whole fire of the enemy. Nevertheless, the engagement continued till night, and he determined to renew it next morning. But he had the mortification to perceive that all the rest of his ships had fallen back, except one, who joined him in urging the pursuit of the enemy. Four days this intrepid seaman, assisted by only one ship, pursued and engaged the enemy, while his cowardly officers remained at a distance behind. His last day's battle was more furious than any of the former: alone, and unsupported by any of the rest, he engaged the whole French squadron; when his leg was shattered by a cannon-ball, and he himself died soon after of his wounds. Two of his cowardly associates were shot on their arrival in England; one died on his passage thither; the rest were disgraced.

The next parliament, which was convened by the queen, were highly pleased with the success of the British arms on the continent. The house of commons was composed chiefly of Tories, who voted 40,000 seamen, and the like number of land-forces, to act in conjunction with those of the allies. Soon after, the queen informed her parliament, that she was pressed by the allies to augment her forces; and upon this it was resolved that 10,000 more men should be added to the continental-army, but on condition that the Dutch should immediately break off all commerce with France and

Spain; and this condition was very readily complied with.

In the beginning of April 1703, the duke of Marlborough crossed the sea, and, assembling the allied army, opened the campaign with the siege of Bonn, the residence of the elector of Cologne. This held out but a short time. He next retook Huy; the garrison of which, after a vigorous defence, surrendered prisoners of war. Limburg was next besieged, and surrendered in two days; and thus the campaign concluded, the allies having secured the country of Liege, and the electorate of Cologne, from the designs of the enemy.

In the campaign of 1704, the duke of Marlborough informed the Dutch that it was his intention to march to the relief of the empire, which had been for some time oppressed by the French forces; and the states gave him full powers to march as he thought proper, with assurances of their assistance in all his endeavours. The French king, finding Boufflers no longer capable of opposing Marlborough, appointed the marshal de Villeroi to command in his place. But Marlborough, who, like Hannibal of old, was remarkable for studying the disposition of his antagonists, having no great fears from Villeroi, immediately flew to the assistance of the emperor. Taking with him about 13,000 British troops, he advanced by hasty marches to the banks of the Danube; he defeated a body of French and Bavarians stationed at Donavert to oppose him; then passed the river, and laid under contribution the dukedom of Bavaria that had sided with the enemy. Villeroi, who at first attempted to follow his motions, seemed all at once to have lost sight of his enemy; nor was he apprised of his route, till informed of his successes. But, in the mean time, marshal Tallard prepared by another route to obstruct Marlborough's retreat, with an army of 30,000 men. He was soon after joined by the duke of Bavaria's forces; so that the French army in that part of the continent amounted to 60,000 veterans, commanded by the two best reputed generals then in France.

To oppose these powerful generals, the duke of Marlborough was joined by a body of 30,000 men under the celebrated prince Eugene. The allied army, with this reinforcement, amounted to about 52,000. After various marches and countermarches, the two armies met at Blenheim. A terrible engagement ensued, in which the French were entirely defeated, and a country of 100 leagues extent fell into the hands of the conquerors. Soon after finishing the campaign, the duke repaired to Berlin, where he procured a reinforcement of 8000 Prussians to serve under prince Eugene in Italy. Thence he proceeded to negotiate for succours at the court of Hanover; and soon after returned to England, where he was received with every possible demonstration of joy.

The arms of Britain, in the mean time, were not less fortunate by sea than by land. The town of Gibraltar was taken by the prince of Hesse and Sir George Rooke: but so little was the value of the conquest at that time understood, that it was for some time in debate whether it was a capture worth thanking the admiral for; and at last it was considered as unworthy of public gratitude. Soon after, the British fleet, to the number of 53 ships of the line, came up with that of France, consisting of 52 men of war, commanded by the

Britain.

349
Success of
Marlborough.

345
Zoffen at sea.

346
Bravery and
death of admiral
Bembow.

347
Continental
army increased.

349
French defeated at
Blenheim.

† See Blenheim.

350
Gibraltar taken.

351
French defeated at sea.

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the count de Thoulouse, off the coast of Malaga. This was the last great naval engagement in which the French ventured to face the British on equal terms. The battle began at ten in the forenoon, and continued with great fury for six hours; when the van of the French began to give way. The British admiral, for two days, attempted to renew the engagement; but this was as cautiously declined by the French, who at last disappeared totally. Both sides claimed the victory, but the consequences decided it in favour of the British.

352
Ineffectual attempt of the Spaniards on Gibraltar.

In the mean time, the Spaniards, alarmed at the taking of Gibraltar, sent the marquis de Villadurias with a large army to retake it. France also sent a fleet of 13 ships of the line: but part of them were dispersed by a tempest, and part taken by the British. Nor was the land army more successful. The siege continued for four months; during which time the prince of Hesse, who commanded the town for the English, gave many proofs of valour. At length, the Spaniards having attempted to scale the rock in vain, finding no hopes of taking the place, were contented to draw off their men, and abandon the enterprise.

353
Charles appointed king of Spain.

While the British were thus victorious by land and sea, a new scene of contention was opened on the side of Spain. Philip IV. grandson of Lewis XIV. had been placed on the throne of that kingdom, and received with the joyful concurrence of the greatest part of his subjects. He had also been nominated successor to the crown by the late king of Spain's will. But in a former treaty among the powers of Europe, Charles, son of the emperor of Germany, was appointed heir to that crown; and this treaty had been guarantee'd by France herself, though she now resolved to revert that consent in favour of a descendant of the house of Bourbon. Charles was still farther led on to put in for the crown of Spain, by the invitation of the Catalonians, who declared in his favour; and, with the assistance of the British and Portuguese, promised to arm in his cause. Upon his way to his newly assumed dominion, he landed in England; where he was received on shore by the dukes of Somerset and Marlborough, who conducted him to Windsor. He was kindly received by the queen; and furnished with 200 transports, 30 ships of war, and 9000 men, for the conquest of that extensive empire. The earl of Peterborough, a man of romantic bravery, offered to conduct them; and his single service was reckoned equivalent to armies.

354
He is supported by queen Anne

355
Barcelona taken.

The first attempt of this general was on the city of Barcelona, at that time defended by a garrison of 5000 men. The fort Monjuic, situated on a hill that commanded the city, was attacked; the outworks were taken by storm, and the powder-magazine was blown up by a shell; upon which the fort immediately surrendered, and the city capitulated in a short time after. The conquest of all Valencia succeeded the taking of Barcelona. Charles became master of Arragon, Cathagea, Grenada, and Madrid. The British general entered the capital in triumph, and there proclaimed Charles king of Spain without opposition.

356
French defeated at Ramillies.

To these successes, however, very little regard was paid in Britain. The victories of the duke of Marlborough alone engrossed their attention. In 1706, he opened the campaign with an army of 80,000 men. He was met by the French under Villeroi near the village of Ramillies †. An engagement ensued, in which

† See Ramillies.

the duke gained a victory almost as complete as that of Blenheim had been; and the whole country of Brabant was the reward of the victors. The French troops were now dispirited; the city of Paris was in confusion; Lewis, who had long been flattered with conquest, was now humbled to such a degree as almost to excite the compassion of his enemies. He entreated for peace, but in vain; the allies carried all before them; and his very capital began to dread the approach of the conquerors. But what neither his armies nor his politics could effect, was brought about by a party in England. The dissension between the whigs and tories saved France that now seemed tottering on the brink of ruin.

357
Lewis flies in vain for peace.

The councils of the queen had hitherto been governed by a whig ministry; for though the duke of Marlborough started in the interest of the opposite party, he soon joined the whigs, as he found them most sincere in the design of humbling France. The people, however, were now, in fact, beginning to change, and a general spirit of toriyism to take place. The queen's personal virtues, her successes, her deference for the clergy, and their great veneration for her, began to have a prevailing influence over the whole nation. People of every rank were not ashamed to defend the most servile tenets, when they tended to flatter or increase the power of the sovereign. They argued in favour of strict hereditary succession, divine right, and non-resistance to the regal power. The tories, though joining in vigorous measures against France, were never ardently their enemies: they rather secretly hated the Dutch, as of principles very opposite to their own; and longed for an opportunity of withdrawing from their friendship. They began to meditate schemes of opposition to the duke of Marlborough. Him they considered as a self-interested man, who sacrificed the real advantages of the nation, in protracting a ruinous war for his own private emolument and glory. They saw their country oppressed with an increasing load of taxes, which by a continuance of the war must inevitably become an intolerable burden. Their discontents began to spread, and the tories wanted only a few determined leaders to assist them in removing the present ministry.

358
English defeated at Almanza.

In the mean time a succession of losses began to dissipate the conquering frenzy that had seized the nation in general, and to incline them to wish for peace. The earl of Galway, who commanded the army in Spain, was utterly defeated at Almanza † by the duke of Berwick; † See Almanza. and in consequence of this victory, all Spain, except the province of Catalonia, returned to their duty, to Philip their lawful sovereign. An attempt was made upon Toulon, by the duke of Savoy and prince Eugene by land, and an English fleet by sea; but to no purpose. The fleet under Sir Cloudesly Shovel, having set sail for England, was driven by a violent storm on the rocks of Scilly. His own ship was lost, and every soul on board perished. Three more ships met with the same fate; while three or four others were saved with the utmost difficulty. In Germany, marshal Villars the French general carried all before him, and was upon the point of restoring the elector of Bavaria. The only hopes of the people lay in the activity and conduct of the duke of Marlborough, who opened the campaign of 1707, about the middle of May; but even here they were disappointed. The duke declined an engagement; and after several marchings and countermarchings, both armies

360
Sir Cloudesly Shovel.

armies

Britain.

armies retired into winter-quarters about the end of October. The French made vigorous preparations for the next campaign; and the duke returned to England to meet with a reception he did not at all expect, and which, as far as appears, he did not deserve.

The most remarkable transaction, however, of this year, and indeed of this whole reign, was the union between the two kingdoms of Scotland and England. Though governed by one sovereign since the time of James I. of England, yet each nation continued to be ruled by its respective parliament; and often professed to pursue opposite interests to those of its neighbour. The union had often been unsuccessfully attempted before. A new attempt commenced with the beginning of Anne's reign: but some disputes arising relative to the trade of the east, the conference was broke up, and it was thought that an agreement would be impossible. It was revived by an act in either parliament, granting power to commissioners named on the part of both nations to treat on the preliminary articles of an union, which should afterwards undergo a more thorough discussion by the legislative body of both kingdoms. The choice of these commissioners was left to the queen; and she took care that none should be employed but such as heartily concurred in the measure.

The commissioners met in the council-chamber of the cock-pit near Whitehall; which was the place appointed for their conferences. Their commissions being opened, and introductory speeches pronounced by the lord keeper of England and by the lord chancellor of Scotland, the conference began. The Scots commissioners were inclined to a federal union like that of the United Provinces; but the English were bent upon an incorporation, so that no Scottish parliament should ever have power to repeal the articles of this treaty. The lord keeper Cowper proposed, that the two kingdoms of Scotland and England should be for ever united into one, under the name of *Great Britain*; that it should be represented by one and the same parliament, and governed by the same hereditary monarch. The Scots commissioners, on their part, insisted that the subjects of Scotland should forever enjoy the same rights and privileges with those of England; and that all statutes, contrary to the tenor of these privileges in either kingdom, should be repealed. As the queen frequently exhorted them to dispatch, the articles of this famous union were soon agreed to by the commissioners; and it only remained to lay them before the parliaments of both nations.

By these articles it was stipulated, That the succession to the united kingdoms should be vested in the house of Hanover; that the united kingdoms should be represented by one and the same parliament; that all the subjects of Great Britain should enjoy a communication of privileges and advantages; that they should have the same allowances and privileges with respect to commerce and customs; that the laws concerning public right, civil government, and policy, should be the same throughout the two united kingdoms; but that no alteration should be made in laws which concerned private right, except for the evident benefit of the subjects of Scotland; that the courts of session, and all other courts of judicature in Scotland, should remain as then constituted by the laws of that kingdom, with the same authority and privileges as before the union; that

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Scotland should be represented in the parliament of Great Britain by 16 peers, and 45 commoners, to be elected in such a manner as should be settled by the present parliament of Scotland; that all peers of Scotland should be considered as peers of Great Britain, and rank immediately after the English peers of the like degrees at the time of the union, and before such as should be created after it; that they should enjoy all the privileges of English peers, except sitting in the house of lords and voting on the trial of a peer; that all the insignia of royalty and government should remain as they were; that all laws and statutes in either kingdom, as far as they might be inconsistent with the terms of these articles, should cease, and be declared void by both parliaments.

The obtaining the sanction of the English and Scots parliaments to these articles, was found to be a matter of much more difficulty than had been at first imagined. To induce the Scots parliament to come into the measure, it was alleged by the ministry and their supporters, that an entire and perfect union would be the foundation of a solid and lasting peace. It would secure their religion, liberty, and property; remove the animosities that prevailed among themselves, and the jealousies that subsisted between the two nations. It would increase their strength, riches, and commerce. The whole island would be joined in affection, and freed from all apprehensions of different interests, so as to be enabled to resist all its enemies, to support the Protestant interest, and maintain the liberties of Europe. It was observed, that the less the wheels of government were clogged by a multiplicity of councils, the more vigorous would be their exertions. They were shown, that the taxes, which in consequence of this union they were to pay, were by no means proportionable to their share in the legislature: that their taxes did not amount to a 70th part of those supplied by the English, and yet their share in the legislature was not a tenth part less. In the English houses it was observed, that a powerful and dangerous nation would thus for ever be prevented from giving them any disturbance: that in case of any future rupture, England had every thing to lose, and nothing to gain, against a nation that was courageous and poor.

On the other hand, the Scots were fired with indignation at the thoughts of losing their ancient and independent government. The nobility found themselves degraded in point of dignity and influence, by being excluded from their seats in parliament. The trading part of the nation beheld their commerce loaded with heavy duties, and considered their new privilege of trading to the English plantations in the West Indies as a very uncertain advantage. In the English houses also it was observed, that the union of a rich with a poor nation would be always beneficial to the latter, and that the former could only hope for a participation of their necessities.—It was said, that the Scots reluctantly yielded to this coalition, and that it might be likened to a marriage with a woman against her consent. It was supposed to be an union made up of so many unmatched pieces, and such incongruous ingredients, that it could never take effect. It was complained, that the proportion of the land-tax paid by the Scots was small, and unequal to their share of the legislature.

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To these arguments in both nations, besides the shew of a particular answer to each, one great argument was added, which preponderated against all the lesser ones. It was observed, that all inconveniences were to be overlooked in the attainment of one great solid advantage; viz. that of acting with an uniformity of councils for the benefit of a community naturally united. The party therefore for the union prevailed; and this measure was carried in both nations, through all the obstacles of pretended patriotism and private interest.

Notwithstanding all the opposition of the English Tories, every article of the union was approved in the house of lords; and being sent to be ratified by the house of commons, Sir Simon Harcourt prepared the bill in such an artful manner as to prevent all debates. All the articles as they passed in Scotland were recited by way of preamble; and in the conclusion there was one clause by which the whole was ratified and enacted into a law. By this contrivance, those who were desirous of starting new difficulties found themselves disabled from pursuing their aim: they could not object to the recital which was merely a matter of fact; and they had not strength sufficient to oppose all the articles at once, which had before passed with the majority. It passed in the house of commons by a majority of 114; it made its way through the house of lords a second time with equal ease; and when it received the royal sanction, the queen expressed the utmost satisfaction.

The duke of Marlborough in the mean time returned to Flanders, where he seemed resolved to push his good fortune. Peace had been offered more than once; treaties entered upon, and as often frustrated. After the battle of Ramillies, the king of France had employed the elector of Bavaria to write letters in his name to the duke of Marlborough, containing proposals for opening a congress. He offered to give up either Spain and its dominions, or the kingdoms of Naples and Sicily, to Charles of Austria, and to give a barrier to the Dutch in the Netherlands. But these terms were rejected. The two armies once more met in numbers nearly equal at Oudenarde *. An engagement ensued, in which the French were defeated, and Lille the strongest town in Flanders, Ghent, Bruges, and all the other towns in that country, soon after fell into the hands of the victors. The campaign ended with fixing a barrier to the Dutch provinces, and it now only remained to force a way into the provinces of the enemy.

The French king, being now in a manner reduced to despair, again sued for peace; but the demands of the allies were so high, that he was obliged to reject them, and prepare for another campaign. This was in the year 1709. The first attempt of the allies was on the city of Tournay, garrisoned by 12,000 men, and exceedingly strong both by nature and art. After a terrible siege of 21 days, the town capitulated; and a month afterwards the citadel, which was still stronger than the town. Next followed the bloody battle of Malplaquet †; where the allied army, consisting of 110,000 men, attacked the French consisting of 120,000, strongly posted and fortified in such a manner that they seemed quite inaccessible. Nothing, however, was able to stand before the allied army; they drove the French

from their fortifications: but their victory cost them dear; 20,000 of their best troops lay dead on the field of battle. The consequence of this victory was the surrender of the city of Mons, which ended the campaign.

The last campaign of the duke of Marlborough, which happened in the year 1711, is said to have excelled all his former exploits. He was opposed by the marshal Villars, the fame who had commanded the French in the battle of Malplaquet. He contrived his measures so, that, by marching and countermarching, he induced the enemy to quit a strong line of entrenchments without striking a blow, which he came afterwards and took possession of. This enterprize was followed by the taking of Bouchain, which was the last military achievement of this great general. By a continuance of conduct and success almost unparalleled, he had gained to the allies a prodigious tract of country. From the beginning of the war, which had now continued nine years, he had perpetually advanced, and never retreated before his enemies, nor lost an advantage he had obtained over them. He most frequently gained the enemy's posts without fighting; but where he was obliged to attack, no fortifications were able to resist him. He had never besieged a city which he did not take, nor engaged in a battle in which he did not come off victorious. Thus the allies had reduced under their command Spanish Guelderland, Limbourg, Brabant, Flanders, and Hainault; they were masters of the Scarpe, the capture of Bouchain had opened for them a way into the heart of France, and another campaign might have made them masters of Paris: but on the duke's return from this campaign, he was accused of having taken a bribe of 6000 l. a-year from a Jew who had contracted to supply the army with bread; and the queen thought proper to dismiss him from all his employments.

The disgrace of the duke of Marlborough had been owing to the prevalence of the tory party, who had now got the whig ministry turned out: the consequence of this was, that in spite of all the remonstrances, memorials, &c. of the allies, the British army in Flanders was ordered not to act offensively; and in 1713, a peace was concluded between France and Britain. In this treaty it was stipulated, that Philip, now acknowledged king of Spain, should renounce all right to the crown of France, the union of two such powerful kingdoms being thought dangerous to the liberties of Europe. It was agreed, that the duke of Berry, Philip's brother, and after him in succession, should also renounce his right to the crown of Spain, in case he became king of France. It was stipulated, that the duke of Savoy should possess the island of Sicily, with the title of king; together with Fenestrelles, and other places on the continent; which increase of dominion was in some measure made out of the spoils of the French monarchy. The Dutch had the barrier granted them which they so much desired; and if the crown of France was deprived of some dominions to enrich the duke of Savoy, on the other hand the house of Austria was taxed to supply the wants of the Hollanders, who were put in possession of the strongest towns in Flanders. The fortifications of Dunkirk were demolished. Spain gave up Gibraltar and the island of Minorca. Scotland resigned her pretensions to Hudson's bay, Nova Scotia,

and

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Last campaign of the duke of Marlborough.

365
His excellent conduct

366
He is dismissed from all his employments.

367
Peace with France.

362
French defeated at Oudenarde.

* See Oudenarde.

* See Malplaquet.

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And at Malplaquet.

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and Newfoundland; but was left in possession of Cape Breton, and the liberty of drying fish upon the shore. Among the articles glorious to the British nation, their settling free the French Protestants confined in the prisons and galleys for their religion, was not the least meritorious. For the emperor it was stipulated, that he should possess the kingdom of Naples, the duchy of Milan, and the Spanish Netherlands. The king of Prussia was to have Upper Guelder; and a time was fixed for the emperor's acceding to these articles, as he had for some time obstinately refused to assist at the negotiation.

This famous treaty, which was signed at Utrecht on the last day of March 1713, was the last remarkable transaction of this reign. The rest of its history consists entirely of the intrigues of the whigs and tories against one another; which, as they are now of no importance, it is needless to take up time in relating, further than that the tory influence continued to prevail. Whether the ministry at this time wished to alter the succession from the Hanoverian line, cannot now be clearly made out; but certain it is, that the whigs firmly believed it, and the tories but faintly denied the charge. 'The suspicions of the former became every day stronger, particularly when they saw a total removal of the whigs from all places of trust and confidence throughout the kingdom, and their employments bestowed on professed tories, supposed to be maintainers of an unbroken hereditary succession.

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Death of the
queen.

The violent dissensions between these two parties, their unbounded licentiousness, cabals, and tumults, made the queen's situation very disagreeable; her health declined; and on the 28th of July 1714, she fell into a lethargic insensibility. Notwithstanding all the medicines the physicians could prescribe, the distemper gained ground so fast, that next day they despaired of her life. All the members of the privy council, without distinction, were now summoned from the different parts of the kingdom; they began to provide for the security of the constitution. A letter was sent to the elector of Hanover, informing him of the queen's desperate situation, and desiring him to repair to Holland, where he would be attended by a British squadron to convey him to England. At the same time they dispatched instructions to the earl of Strafford at the Hague, to desire the States-general to be ready to perform the guaranty of the Protestant succession. Precautions were taken to secure the sea-ports; and the command of the fleet was bestowed upon the earl of Berkeley, a professed whig. These measures, which were all dictated by that party, answered a double end. They argued the alacrity of the whigs in the cause of their new sovereign, and seemed to imply that the state was in danger from the disaffection of the opposite party.

On the 30th of July the queen seemed to be somewhat relieved by the medicines which had been given her. She rose from her bed about eight in the morning, and walked a little. After some time, casting her eyes on a clock that stood in her chamber, she continued to gaze at it for some minutes. One of the ladies in waiting asked her what she saw there more than usual; to which the queen only answered by turning her eyes upon her with a dying look. She was soon after seized with an apoplectic fit; from which, however, she was somewhat recovered by the assistance of

Dr Mead. She continued all night in a state of suspension. She gave some signs of life betwixt twelve and one the next day; but expired the following morning, a little after seven o'clock, having lived 49 years, and reigned upwards of twelve. This princess was remarkable neither for her learning nor her capacity. Like all the rest of her family, she seemed rather fitted for the duties of private life than a public station; being a pattern of conjugal fidelity, a good mother, a warm friend, and an indulgent mistress; and to her honour it certainly must be recorded, that during her reign none suffered on the scaffold for treason. In her ended the line of the Stuarts; a family who never rewarded their friends, nor ever avenged them of their adversaries; a family whose misfortunes and misconducts are not to be paralleled in history.

The queen had no sooner resigned her breath, than the privy-council met, and three instruments were produced, by which the elector of Hanover appointed several of his known adherents to be added as lords justices to the seven great officers of the kingdom. Orders also were immediately issued out for proclaiming George king of England, Scotland, and Ireland. The regency appointed the earl of Dorset to carry him the intimation of his accession to the crown, and to attend him in his journey to England. They sent the general officers, in whom they could confide, to their posts; they reinforced the garrison of Portsmouth, and appointed the celebrated Mr Addison secretary of state. No tumult, no commotion, arose against the accession of the new king; and this gives a strong proof that the tories, had they really intended to exclude him, never took any rational measures to accomplish their purpose.

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She is suc-
ceeded by
George I.

The king first landed at Greenwich; where he was received by the duke of Northumberland, captain of the lifeguard, and the lords of the regency. From the landing-place he walked to his house in the park, accompanied by a great number of the nobility and other persons of distinction, who expected to make their court in this reign in consequence of their turbulence and opposition to the reigning party in the last. George I. was 54 years old when he ascended the British throne. His mature age, his sagacity and experience, his numerous alliances, and the general tranquillity of Europe, all contributed to establish his interests, and promise him a peaceable and happy reign. His virtues, though not shining, were solid; and he was of a very different disposition from the Stuart family whom he succeeded. These were known to a proverb for leaving their friends in extremity; George, on the contrary, soon after his arrival in England, was heard to say, "My maxim is, never to abandon my friends, to do justice to all the world, and to fear no man." To these qualities of resolution and perseverance, he joined great application to business. One fault, however, with regard to England, remained behind: he studied the interests of the kingdom he had left, more than of those he came to govern.

The new king soon discovered his inclination to support those who had raised him to the throne, that is, the whig party. When he retired to his bed-chamber, after his first landing, he sent for such of the nobility as had distinguished themselves by their zeal for his succession. He expressed the greatest regard for the

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He favours
the whigs.

duke

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duke of Marlborough just then arrived from the continent, whither he had been driven by the violence of the Tories. The same friendship he professed for the other leaders of the whigs; but the Tories found themselves excluded from the royal favour. The king did not seem sensible that the monarch of a faction rules but one half of his subjects. It was his misfortune, and consequently that of the nation, that he was hemmed round by men who foured him with all their own interests and prejudices. The whigs, while they pretended to secure the crown for the king, were using all their art to confirm their own interests, extend their connections, and give laws to their sovereign. An instantaneous change was made in all the offices of trust, honour, or advantage. The names of the contending parties were changed into those of *Hanoverians* and *Jacobites*. The former governed the senate and court, oppressed whom they would, bound the lower orders of people by severe laws, and kept them at a distance by vile distinctions; and then taught them to call this *liberty*.

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National
discontents.

In consequence of these partialities, the highest discontents were raised through the whole kingdom. The Tories or Jacobites raised the most terrible outcries; and had the pretender been a man of any judgment or abilities, a fair opportunity was now offered him of striking a decisive blow. Instead of this, he continued a calm spectator on the continent, and only sent over his emissaries to disperse ineffectual manifestoes and delude the unwary. In these papers he observed, that the late queen had intentions of calling him to the crown. He expostulated with his people upon the injustice they had done themselves in proclaiming a foreign prince for their sovereign, contrary to the laws of the country, that gave him alone the real claim. Copies of a printed address were sent to the dukes of Shrewsbury, Marlborough, Argyle, and other noblemen of the first distinction; vindicating his right to the crown, and complaining of the injustice of his people. Yet, though he still complained of their conduct, he never took any step to correct his own, or remove that obstacle by which his father had lost his throne. He still continued to profess the truest regard to the Catholic religion; and, instead of concealing his sentiments on that head, gloried in his principles.

But, however much the Popish religion was at that time hated in England, the principles of the dissenters were not in the least more agreeable to the generality. The Tories affirmed, that, under a whig administration, heresy and impiety were daily gaining ground. The lower orders of the clergy joined in these complaints, and pointed out several tracts published in favour of Arianism and Socinianism. The ministry not only refused to punish the delinquents, but silenced the clergy themselves, and forbade their future disputations on these topics.—The parliament was now dissolved, and another called by a very extraordinary proclamation. In this the king complained of the evil designs of men dissatisfied to his succession; and of their having misrepresented his conduct and principles. He expressed his hopes, that his subjects would send up to parliament the fittest persons to redress the present disorders. He intreated that they would elect such in particular as had expressed a firm attachment to the Protestant succession when it was in danger. In the election of this

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important parliament, uncommon vigour was exerted on both sides; but by dint of the monied interest that prevailed in corporations, and the activity of the ministry, a great majority of whigs was returned both in England and Scotland.

Upon the first meeting of this new parliament, the most violent measures were resolved upon against the late ministry. Part of them kept away from business. A committee was appointed to inspect all the papers relative to the late treaty, and to pick out such of them as might serve for grounds of accusation against the late ministry. The earl of Oxford was impeached of high treason, and sent to the Tower. The violence of the commons was answered with equal violence without doors. Tumults became every day more frequent, and every tumult served only to increase the severity of the legislature. They now passed an act, declaring, that if any persons to the number of 12, unlawfully assembled, should continue together one hour after being required to disperse by a justice of peace or other officer, and after hearing the act against riots read in public, they should be deemed guilty of felony without benefit of clergy. This is a very severe act, and one of the greatest restrictions on the liberty of the subject that has passed during this century; as by it, all meetings of the people, either for the purposes of amusement or redress, are rendered criminal, if it shall please any magistrate to consider them as such.

These vindictive proceedings excited the indignation of the people, who perceived that the avenues of royal favour were closed to all but a faction. A rebellion commenced in Scotland, where to their other grievances they joined that of the union, which they were taught to consider as an oppression. The malcontents of this country had all along maintained a correspondence with their friends in England, who were now driven by resentment and apprehension into a system of policies they would not otherwise have dreamed of. Some of the Tory party, who were men attached to the Protestant religion, and of moderate principles in government, began to associate with the Jacobites, and to wish in earnest for a revolution. Scotland first shewed them the example. The earl of Mar, assembling 300 of his vassals in the Highlands, proclaimed the pretender at Castleton; and setting up his standard at Braemar, assumed the title of *lieutenant-general of his majesty's forces*. To second these attempts, two vessels arrived from France, with arms, ammunition, and a number of officers, together with assurances to the earl, that the pretender himself would shortly come over to head his own forces. In consequence of this promise, the earl soon found himself at the head of 10,000 men well armed and provided. He secured the pass of Tay at Perth, where his head-quarters were established; and made himself master of the whole province of Fife, and all the sea-coast on that side of the frith of Forth. He marched from thence to Dumblain, as if he had intended to cross the Forth at Stirling bridge; but there he was informed that the duke of Argyle, who on this occasion was appointed commander in chief of all the forces in North Britain, was advancing against him from Stirling with all his own clans, assisted by some troops from Ireland. Upon this, he thought proper at first to retreat; but being soon after joined by some of the clans under the earl of Seaforth, and others under general

8 Y

Gordon,

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Violent pro-
ceedings of
the new par-
liament.

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Rebellion in
Scotland.

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Parliament
dissolved.

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Battle near
Dumblain.

Gordon, an experienced officer, who had signalized himself in the Russian service, he resolved to face the enemy, and directed his march towards the south.

The duke of Argyle, apprized of his intentions, and at any rate willing to prove his attachment to the present government, resolved to give him battle in the neighbourhood of Dumblain, though his forces did not amount to half the number of the enemy. In the morning, therefore, he drew up his army, which did not exceed 3500 men, in order of battle; but he soon found himself greatly outflanked by the insurgents. The duke, therefore, perceiving the earl make attempts to surround him, was obliged to alter his disposition, which, on account of the scarcity of general officers, was not done so expeditiously as to be finished before the rebels began the attack. The left wing of the duke's army received the centre of the enemy, and supported the first charge without shrinking. It seemed even for a while victorious, and the earl of Clanronald was killed. But Glengary, who was second in command, undertook to inspire his intimidated forces with courage; and, waving his bonnet, cried out several times, *Revenge!* This animated the rebel troops to such a degree, that they followed him close to the points of the enemies bayonets, and got within their guard. A total rout began to ensue of that wing of the royal army; and general Wetham, their commander, flying full speed to Stirlings, gave out that the rebels were completely victorious. In the mean time, the duke of Argyle, who commanded in person on the right, attacked the left of the enemy; and, drove them before him two miles, though they often faced about and attempted to rally. Having thus entirely broken that wing, and driven them over the river Allen, he returned back to the field of battle; where, to his great mortification, he found the enemy victorious, and patiently waiting for the assault. However, instead of renewing the engagement, both armies continued to gaze at each other, neither caring to begin the attack. In the evening, both parties drew off, and both claimed the victory. All the advantages of a victory, however, belonged to Argyle. He had interrupted the progress of the enemy; and, in their circumstances, delay was defeat. In fact, the earl of Mar soon found his losses and disappointments increase. The castle of Inverness, of which he was in possession, was delivered up by lord Lovat, who had hitherto professed to act in the interest of the pretender. The marquis of Tullibardine forsook the earl, in order to defend his own part of the country; and many of the clans feeling no likelihood of coming to a second engagement, returned quietly home.

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Bad conduct
of James's
party.

In the mean time, the rebellion was still more unsuccessfully prosecuted in England. From the time the pretender had undertaken this wild project at Paris, in which the duke of Ormond and lord Bolingbroke were engaged, lord Stair the English ambassador there had penetrated all his designs, and sent faithful accounts of all his measures and of all his adherents to the ministry at home. Upon the first rumour, therefore, of an insurrection, they imprisoned several lords and gentlemen, of whom they had a suspicion. But these precautions were not able to stop the insurrection in the western counties, where it was already begun. All their preparations, however, were weak and ill con-

ducted; every measure was betrayed to government as soon as projected, and many revolts were repressed in the very outset. The university of Oxford was treated with great severity on this occasion. Major-general Pepper, with a strong detachment of dragoons, took possession of the city at day-break, declaring that he would instantly shoot any of the students who should presume to appear without the limits of their respective colleges.

The insurrection in the northern counties came to greater maturity. In the month of October 1715, the earl of Derwentwater, and Mr Forster, took the field with a body of horse, and, being joined by some gentlemen from the borders of Scotland, proclaimed the pretender. Their first attempt was to seize upon Newcastle, in which they had many friends; but finding the gates shut against them, they retired to Hexham. To oppose these, general Carpenter was detached by government with a body of 900 men, and an engagement was hourly expected. The rebels had two methods by which they might have conducted themselves with prudence and safety. The one was to march directly into the western parts of Scotland, and there join general Gordon, who commanded a strong body of Highlanders. The other was to cross the Tweed, and boldly attack general Carpenter, whose forces did not exceed their own. From the insatiation attendant on the measures of that party, neither of these counsels was pursued. They took the rout to Jedburgh, where they hoped to leave Carpenter on one side, and penetrate into England by the western border. This was the effectual means to cut themselves off either from retreat or assistance. A party of Highlanders, who had joined them by this time, at first refused to accompany them in such a desperate incursion, and one half of them actually returned to their own country. At Brampton, Mr Forster opened his commission of general, which had been sent him by the earl of Mar, and there he proclaimed the pretender. They continued their march to Penrith, where the body of the militia that was assembled to oppose them fled at their appearance. From Penrith they proceeded by the way of Kendal and Lancaster to Preston, of which place they took possession without any resistance. But this was the last stage of their ill-advised excursion: for general Wills, at the head of 7000 men, came up to attack them; and from his activity there was no escaping. They now, therefore, began to raise barricades about the town, and to put the place in a posture of defence, repelling the first attacks of the royal army with success. Next day, however, Wills was reinforced by Carpenter, and the town was invested on all sides. In this deplorable situation, to which they were reduced by their own rashness, Forster hoped to capitulate with the general; and accordingly sent colonel Oxburgh, who had been taken prisoner, with a trumpet to propose a capitulation. This, however, Wills refused; alleging that he would not treat with rebels, and that the only favour they had to expect was to be spared from immediate slaughter. These were hard terms, but no better could be obtained. They accordingly laid down their arms, and were put under a strong guard. All the noblemen and leaders were secured, and a few of their officers tried for deserting from the royal army, and shot by order of a court-martial. The common men were imprisoned at

Britain.

378
Expedition
of the earl of
Derwentwater.379
Rebels forced to surrender at Preston.

Chester

Britain.

Chester and Liverpool; the noblemen and considerable officers were sent to London, and led through the streets pinioned and bound together, to intimidate their party.

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Afford
conduct of
James's
party in
France.

Though the schemes of the pretender appear to have been foolishly enough conducted in Britain, yet they were much more so in France. Bolingbroke had been made his secretary at Paris, and Ormond his prime minister. But these statesmen quickly found that nothing could be done in favour of his cause. The king of France, who had ever espoused the interest of the abdicated family, was just dead; and the duke of Orleans, who succeeded in the government of the kingdom, was averse to lending the pretender any assistance. His party, however, which was composed of the lowest and the most ignorant exiles from the British dominions, affected the utmost confidence, and boasted of a certainty of success. The deepest secrets of his cabinet, and all his intended measures, were bandied about in coffee-houses by persons of the lowest rank both in fortune and abilities. Subaltern officers resolved to be his generals; and even prostitutes were entrusted to manage his negotiations. Little, therefore, could be expected from such assistants and such counsils.

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Pretender
lands in
Scotland.

Though, by this time, the pretender might easily have seen that his affairs were desperate; yet, with his usual insatiation, he resolved to hazard his person among his friends in Scotland at a time when such a measure was too late for success. Passing, therefore, through France in disguise, and embarking in a small vessel at Dunkirk, he arrived, after a voyage of a few days, on the coasts of Scotland, with only six gentlemen in his train. He passed unknown through Aberdeen to Feteroffe, where he was met by the earl of Mar, and about 30 noblemen and gentlemen of the first quality. There he was solemnly proclaimed; and his declaration, dated at Commercey, was printed and dispersed. He went from thence to Dundee, where he made a public entry; and in two days more he arrived at Scoon, where he intended to have the ceremony of his coronation performed. He ordered thanksgivings to be made for his safe arrival; he enjoined the ministers to pray for him in their churches; and without the smallest share of power, went through the ceremonies of royalty, which threw an air of ridicule on all his conduct. Having thus spent some time in unimportant parade, he resolved to abandon the enterprise with the same levity with which it was undertaken. Having made a speech to his grand council, he informed them of his want of money, arms, and ammunition, for undertaking a campaign, and therefore deplored that he was obliged to leave them. He once more embarked on board a small French ship that lay in the harbour of Montrose, accompanied with several lords, his adherents; and in five days arrived at Graveline.

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And again
leaves it.

General Gordon, who was left commander in chief of the forces, with the assistance of earl Maréchal, proceeded at their head to Aberdeen, where he secured three vessels to sail northward, which took on board such persons as intended to make their escape to the continent. He then continued his march through the Highlands, and quietly dismissed his forces as he went forward. This retreat was made with such expedition, that the duke of Argyle, with all his activity, could

never overtake his rear, which consisted of 1000 horse.

Britain.

383
Crud treatment
of the
rebels.

The rebellion being ended, the law was put in force with all its terrors; and the prisons of London were crowded with those deluded persons, whom the ministry seemed resolved not to pardon. The commons, in their address to the crown, declared they would prosecute, in the most rigorous manner, the authors of the late rebellion; and their measures were as vindictive as their resolutions were speedy. The earls of Derwentwater, Nithsdale, Carnwath, and Wintown, the lords Widdington, Kenmuir, and Nairne, were impeached; and, upon pleading guilty, all but lord Wintown, received sentence of death. No intreaties could prevail upon the ministry to spare these unhappy men. The house of lords even presented an address to the throne for mercy, but without effect; the king only answered, that on this, as on all other occasions, he would act as he thought most consistent with the dignity of the crown and the safety of the people. Orders were accordingly dispatched for executing the lords Derwentwater, Nithsdale, and Kenmuir, immediately; the rest were respited to a farther time. Nithsdale, however, had the good fortune to escape in woman's clothes that were brought him by his mother the night before his execution. Derwentwater and Kenmuir were brought to the scaffold on Tower-hill at the time appointed. Both underwent their sentence with calm intrepidity, and seemingly less moved than those who beheld them.

An act of parliament was next made for trying the private prisoners in London, and not in Lancashire where they were taken in arms. This was considered, by some of the best lawyers, as an alteration of the ancient constitution of the kingdom, by which it was supposed, that every prisoner should be tried in the place where the offence was committed, as a jury of neighbours would be best qualified to enter into the nature of the offence. In the beginning of April, commissioners for trying the rebels met in the court of common pleas, when the bills were found against Mr Forster, Mr Macintosh, and 20 of their confederates. Forster escaped from Newgate, and reached the continent in safety; the rest pleaded not guilty. Pitts the keeper of Newgate, being suspected of having connived at Forster's escape, was tried for his life, but acquitted. After this, Macintosh, and several other prisoners, broke from Newgate, after having mastered the keeper and turnkey, and disarmed the sentinel. The court proceeded to the trial of those that remained; four or five were hanged, drawn, and quartered, at Tyburn. The judges appointed to try the rebels at Liverpool found a considerable number of them guilty of high treason. Two-and-twenty were executed at Manchester and Preston; about 1000 experienced the king's mercy, if such it may be called, to be transported to North America.

The rebellion being thus extinguished, the danger of the state was made a pretence for continuing the parliament beyond the term fixed for its dissolution. An act, therefore, was made by their own authority, repealing that by which they were to be dissolved every third year, and the term of their duration was extended to seven years. This attempt in any delegated body of people to increase their own power by extending it, is contrary to the first principles of justice. If it was

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Duration
of the parliament
lengthened.

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right to extend their duration to seven years, they might also perpetuate their authority; and thus cut off even the shadow of a nomination. The bill, however, passed both houses, and all objections to it were considered as disaffection. The people might murmur at this encroachment, but it was too late for redress.

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Britain
threatened
with an in-
vasion by
Charles XII.

Domestic concerns being thus adjusted, the king resolved upon a voyage to the continent. He foresaw a storm gathering from Sweden. Charles XII. was highly provoked against him for having entered into a confederacy with the Russians and Danes during his absence at Bender, and for having purchased from the king of Denmark the towns of Bremen and Verden, which constituted a part of his dominions. In consequence of this, Charles maintained a close correspondence with the dissatisfied subjects of Great Britain; and a scheme was formed for landing a considerable body of Swedish forces, with the king at their head, in some part of the island, where it was expected they would be joined by all the malcontents in the kingdom. Count Gyllenbourg, the Swedish minister in London, was peculiarly active in the conspiracy; but being seized, with all his papers, by order of the king, the confederacy was broke for that time. A bill, however, was passed by the commons, forbidding all commerce with Sweden; the trade with which country was at that time of the utmost consequence to the English merchants. George having passed through Holland to Hanover, in order to secure his German dominions, entered into a new treaty with the Dutch and the regent of France, by which they agreed mutually to assist each other in case of an invasion; and for his further security the commons granted him 250,000 *l*. But the death of the Swedish monarch, who was soon after killed at the siege of Frederichshall in Norway, put an end to all disquietude from that quarter.

Among the many treaties for which this reign was remarkable, one had been concluded, which was called the *quadruple alliance*. It was agreed between the emperor, France, Holland, and Britain, that the emperor should renounce all pretensions to the crown of Spain, and exchange Sardinia for Sicily with the duke of Savoy; that the succession to the duchies of Tuscany, Parma, and Placentia, should be settled on the queen of Spain's eldest son, in case the present possessors should die without male issue. This treaty, however, was by no means agreeable to the king of Spain; and consequently it became prejudicial to the English, as it interrupted the commerce with that kingdom. A war soon after commenced between Spain and the emperor, who was considered as the principal contriver of the treaty; and a numerous body of Spanish forces were sent into Italy to support Philip's pretensions in that quarter. The regent of France attempted in vain to dissuade him, and the king of Britain offered his mediation with the like bad success; their interposition was considered as partial and unjust. A Spanish war was then resolved on. A squadron of 22 ships was equipped with all expedition, the command of which was given to Sir George Byng, and ordered to sail for Naples, at that time threatened with a Spanish army. He was received with the greatest joy by the Neapolitans; who informed him that the Spaniards, to the amount of 30,000, were then actually landed in Sicily. In this exigence, as no assistance could be given by

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War with
Spain.

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land, he resolved to sail thither, fully determined to pursue the Spanish fleet on which the army was embarked. Upon coming round Cape Faro, he perceived two small Spanish vessels; and pursuing them closely, they led him to their main fleet, which, before noon, he discovered in line of battle, amounting in all to 27 sail. The Spaniards, however, notwithstanding of their superiority in number, attempted to sail away: but finding it impossible to make their escape, they kept up a running fight, and the commanders behaved with great courage and activity; in spite of which they were all taken, except three, which were preferred by the conduct of one Cammoc, their vice-admiral, a native of Ireland. Sir George Byng behaved on this occasion with great prudence and resolution; and the king wrote him a letter with his own hand, approving his conduct.

The rupture with Spain was thought to be favourable to the interests of the pretender; and it was hoped that, by the assistance of cardinal Alberoni the Spanish minister, a new insurrection might be excited in England. The duke of Ormond was the person fixed upon to conduct this expedition; and he obtained from the Spanish court, a fleet of ten ships of war and transports, having on board 6000 regular troops, with arms for 12,000 more. But fortune was still as unfavourable as ever. Having set sail, and proceeded as far as Cape Finisterre, he was encountered by a violent storm, which disabled his fleet, and frustrated the expedition. This misfortune, together with the bad success of the Spanish arms in Sicily and other parts of Europe, induced Philip to wish for a cessation of arms; and he at last consented to sign the quadruple alliance, by which means peace was again restored to Europe.

Tranquillity being thus established, the ministry proceeded to secure the dependency of the Irish parliament on that of England. One Maurice Annelley had appealed to the house of peers of England from a decree made by the Irish peers, and their decree was reversed. The British peers ordered the barons of exchequer in Ireland to put Mr Annelley in possession of the lands he had lost by the decree of the lords in that kingdom. The barons obeyed this order; and the Irish peers passed a vote against them, as having attempted to diminish the just privileges of the parliament of Ireland; and at the same time ordered the barons to be taken under the custody of the black rod. On the other hand, the house of lords in England resolved, that the barons of the exchequer in Ireland had acted with courage and fidelity; and addressed the king to signify his approbation of their conduct, by some marks of his favour. To complete their intention, a bill was prepared, by which the Irish house of lords was deprived of all right of final jurisdiction. This bill was opposed in both houses, but particularly by the commons. It was there asserted by Mr Pitt, that it would only increase the power of the English peers, who were already but too formidable. Mr Hungerford demonstrated, that the Irish lords had always exerted their power of finally deciding causes. Notwithstanding all opposition, the bill was carried by a great majority, and soon after received the royal assent.

This blow was severely felt by the Irish; but was by no means so great as that which the English about this time felt from the *South-sea scheme*, which com-

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Intended in-
vasion by
the Span-
iards.

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Irish parlia-
ment made
dependent
on that of
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South-sea
scheme.

Britain. menced in the year 1721. To explain this as concisely as possible, it must be observed, that, ever since the revolution under king William, the government not having sufficient supplies granted by parliament, or what was granted requiring time to be collected, they were obliged to borrow money from several different companies of merchants; and, among the rest, from that company which traded to the South-sea. In the year 1716, the government was indebted to this company about nine millions and an half of money; for which they granted at the rate of 6 per cent. interest. As this company was not the only one to which government was indebted, Sir Robert Walpole formed a design of lessening the national debts, giving the several companies an alternative either of accepting a lower interest, namely 5 per cent. or of being paid the principal. The different companies chose rather to accept of the diminished interest, than to be paid the principal. The South-sea company, in particular, having augmented their loan to ten millions, were contented to receive 500,000 l. annually as interest, instead of 600,000 l. which they usually received. In the same manner, the governors and company of the bank, and other companies, were contented to receive a diminished annual interest for their respective loans; all which greatly lessened the debts of the nation.

In this situation of things, one *Blount* a scrivener proposed to the ministry, in the name of the South-sea company, to buy up all the debts of the different companies, and thus for the South-sea company to become the sole creditors of the state. The terms he offered to government were extremely advantageous. The South-sea company was to redeem the debts of the nation out of the hands of the private proprietors who were creditors to the government, upon whatever terms they could agree on; and for the interest of this money which they had thus redeemed and taken into their own hands, they would be contented to be allowed by government 5 per cent for six years; after which the interest should be reduced to 4 per cent. and should at any time be redeemable by parliament. For these purposes a bill passed both houses. But now came the part of the scheme big with fraud and ruin. As the directors of the South-sea company could not of themselves be supposed to possess so much money as was sufficient to buy up the debts of the nation, they were empowered to raise it by opening a subscription to an imaginary scheme for trading in the South seas; from which commerce immense advantages were promised, and still greater expected by the rapacious credulity of the people. All the creditors of government, therefore, were invited to come in, and exchange their securities, viz. the security of government, for that of the South-sea company. The directors books were no sooner opened for the first subscription, but crowds came to make the exchange of government stock for South-sea stock. The delusion was artfully continued and spread. Subscriptions in a few days sold for double the price they had been bought at. The scheme succeeded beyond even the projector's hopes, and the whole nation was infected with a spirit of avaricious enterprise. The insatiation prevailed; the stock increased to a surprising degree, even to near ten times the value of what it was first bought for.

After a few months, however, the people waked

from their dream of riches; and found that all the advantages they expected were merely imaginary, while thousands of families were involved in one common ruin. Many of the directors, by whose arts the people were taught to expect such great benefits from a traffic to the South seas, had amassed considerable fortunes by the credulity of the public. It was some consolation, however, to the people to find the parliament sharing in the general indignation, and resolving to strip those unjust plunderers of their possessions. Orders were first given to remove all the directors of the South-sea company from their seats in parliament, and the places they possessed under government. The principal delinquents were punished by a forfeiture of all such possessions and estates as they had acquired during the continuance of this popular frenzy. The next care was to redress the sufferers. Several just and useful resolutions were taken by parliament, and a bill was speedily prepared for repairing the late sufferings as far as the inspection of the legislature could extend. Of the profits arising from the South-sea scheme, the sum of seven millions were given back to the original proprietors; several additions were also made to their dividends out of what was possessed by the company in their own right; and the remaining capital stock was also divided among the old proprietors at the rate of 33 per cent.—In the mean time, petitions from all parts of the kingdom were presented to the house, demanding justice; and the whole nation seemed exasperated to the highest degree. Public credit sustained a terrible shock. Some principal members of the ministry were deeply concerned in these fraudulent transactions. The bank was drawn upon faster than it could supply; and nothing was heard but the ravings of disappointment, and the cries of despair.

By degrees, however, the effects of this terrible calamity wore off, and matters returned to their former tranquillity. A new war with Spain commenced. Admiral *Holser* was sent to South America to intercept the Spanish galleons; but the Spaniards, being apprized of his design, relanded their treasure. The greatest part of the British fleet sent on that expedition was rendered entirely unfit for service. The seamen were cut off in great numbers by the malignity of the climate and the length of the voyage, while the admiral himself is said to have died of a broken heart. In order to retaliate these hostilities, the Spaniards undertook the siege of Gibraltar; but with as little success on their side. In this dispute France offered her mediation; and such a reconciliation as treaties could procure was the consequence: a temporary peace ensued; both sides only watching an opportunity to renew hostilities with advantage.

Soon after the breaking up of the parliament in the year 1727, the king resolved to visit his electoral dominions of Hanover. Having appointed a regency in his absence, he embarked for Holland, and lay, upon his landing, at a little town called *Voet*. Next day he proceeded on his journey; and in two days more, between ten and eleven at night, arrived at Delden, to all appearance in perfect health. He supped there very heartily, and continued his journey early the next morning; but between eight and nine ordered his coach to stop. It being perceived that one of his hands lay motionless, *monieur Fabrice*, who had formerly been servant to the king of Sweden, and who now attended king

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Directors
punished.391
Unsuccessful
expedition of
admiral Ho-
lser.392
Death of
king George
I.

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king George, attempted to quicken the circulation, by chafing it between his own. As this had no effect, the surgeon who followed on horseback was called, and he rubbed it with spirits. Soon after, the king's tongue began to swell, and he had just strength enough to bid them hasten to Osnaburgh. Then, falling insensible into Fabricé's arms, he never recovered; but expired about 11 o'clock the next morning, in the 68th year of his age, and 13th of his reign. His body was conveyed to Hanover, and interred among his ancestors.

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George II.
succeeds.394
Conflicts be-
tween the
court and
country
parties.

On the accession of George II. the two great parties into which the nation had so long been divided, again changed their names, and were now called the *court* and *country* parties. Throughout the greatest part of this reign, there seem to have been two objects of controversy, which rose up in debate at every session, and tried the strength of the opponents; these were the national debt, and the number of forces to be kept in pay. The government on the present king's accession owed more than 30,000,000 of money; and tho' there was a long continuance of profound peace, yet this sum was found constantly increasing. It was much wondered at by the country party how this could happen, and it was as constantly the business of the court to give plausible reasons for the increase. Thus, demands for new supplies were made every session of parliament, either for the purposes of securing friends upon the continent, of guarding the kingdom from internal conspiracies, or of enabling the ministry to act vigorously in conjunction with the powers in alliance abroad. It was vainly alleged that those expences were incurred without preference or necessity; and that the increase of the national debt, by multiplying and increasing taxes, would at last become an intolerable burden to the poor. These arguments were offered, canvassed, and rejected; the court party was constantly victorious, and every demand was granted with cheerfulness and profusion.

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Account of
the charita-
ble corpora-
tion.

The next thing worthy of notice in the reign of George II. is the *charitable corporation*. A society of men had united themselves into a company by this name; and their professed intention was to lend money at legal interest to the poor upon small pledges, and to persons of higher rank upon proper security. Their capital was at first limited to 30,000*l*. but they afterwards increased it to 600,000*l*. This money was supplied by subscription, and the care of conducting the capital was intrusted to a proper number of directors. This company having continued for more than 20 years, the cashier, George Robinson, member for Marlow, and the warehouse-keeper, John Thompson, disappeared in one day. Five hundred thousand pounds of capital were found to be sunk or embezzled by means which the proprietors could not discover. They, therefore, in a petition, represented to the house the manner in which they had been defrauded, and the distress to which many of the petitioners were reduced. A secret committee being appointed to examine into this grievance, a most iniquitous scene of fraud was soon discovered, which had been carried on by Thompson and Robinson, in concert with some of the directors, for embezzling the capital and cheating the proprietors. Many persons of rank and quality were concerned in this infamous conspiracy; and even some of the first characters in the nation did not escape censure. No less than six members of parliament were expelled for the most fordid acts

of knavery. Sir Robert Sutton, Sir Archibald Grant, and George Robinson, for their frauds in the management of the charitable corporation scheme; Dennis Bond, and Jefferant Burch, for a fraudulent sale of the late unfortunate earl of Derwentwater's estate; and lastly, John Ward, of Hackney, for forgery. It was at this time asserted in the house of lords, that not one shilling of the forfeited estates was ever applied to the service of the public, but became the reward of fraudulence and venality.

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Excise
scheme re-
jected.

This happened in the year 1731; and in 1732, an Excise scheme was formed by Sir Robert Walpole of fixing a general excise. He introduced it by recounting the frauds practised by the factors in London that were employed in selling the American tobacco. To prevent these frauds, he proposed, that instead of having the customs levied in the usual manner upon tobacco, all hereafter to be imported should be lodged in warehouses appointed for that purpose by the officers of the crown; and should from thence be sold, upon paying the duty of 4*d*. per pound, when the proprietor found a purchaser. This proposal raised a violent ferment, both within doors and without. At last, the fury of the people was worked up to such a pitch, that the parliament-house was surrounded by multitudes, who intimidated the ministry, and compelled them to drop the design. The miscarriage of the bill was celebrated with public rejoicings in London and Westminster, and the minister was burned in effigy by the populace at London.

On this occasion an attempt was made to repeal the septennial bill, and bring back triennial parliaments, as settled at the Revolution. But notwithstanding the warmth of the opposition, the ministry, exerting all their strength, were victorious, and the motion was suppressed by the majority. However, as on this occasion the country party seemed to have gained strength, it was thought proper to dissolve the parliament; and another was called by the same proclamation.

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Parliament
dissolved.

The same disputes were carried on in this parliament as in the former. New subjects of controversy offered every day, and both sides were eager to seize them. A convention agreed on by the ministry, at the Prado, with Spain, became an object of warm altercation. By this the court of Spain agreed to pay 95,000*l*. to the English, as a satisfaction for all demands; and to discharge the whole in four months from the day of ratification. This, however, was considered as no equivalent to the damages that had been sustained, which were said to amount to 340,000*l*. On this occasion the ministry was provoked into unusual vehemence, and branded the opposite party with the appellation of traitors. The ministry, as usual, were victorious; and the country party finding themselves out-numbered and out-voted in every debate, resolved to withdraw for ever: Walpole, being thus left without opposition, took the opportunity of passing several useful laws in their absence, in order to render the opposite party odious or contemptible.

In 1739, a new war commenced with Spain. Ever since the treaty of Utrecht, the Spaniards in America had insulted and distressed the commerce of Great Britain; and the British merchants had endeavoured to carry on an illicit trade in their dominions. As a right of cutting logwood in the bay of Campeachy, claimed by the British, gave them frequent opportuni-

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War with
Spain.

ties

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399
Porto Bello
taken.

ties of pulling in contraband commodities upon the continent, the Spaniards resolved to put a stop to the evil by refusing liberty to cut logwood in that place. The Spanish guarda-costas continued their severities upon the British, and many British subjects were sent to dig in the mines of Potosi. One remonstrance followed another to the court of Madrid; but the only answers given were promises of inquiry, which produced no reformation. In 1739, war was declared with all proper solemnity; and soon after, admiral Vernon, with six ships only, destroyed all the fortifications of Porto Bello, and came away victorious, with scarce the loss of a man.

400
Anson's ex-
pedition.

As the war was thus successfully begun, supplies were cheerfully granted to prosecute it with all imaginable vigour. Commodore Anson was sent with a squadron of ships to distress the enemy in the South Seas, and to co-operate occasionally with admiral Vernon across the isthmus of Darien. This squadron was designed to act a subordinate part to a formidable armament that was to be sent against New Spain; but through the mismanagement of the ministry both these schemes were frustrated. Anson was detained till too late in the season; he then set out with five ships of the line, a frigate, and two store-ships, with about 1400 men. Coming into the stormy South Seas at a very wrong season of the year, he encountered the most terrible storms; his fleet was dispersed, and his crew deplorably afflicted with the scurvy; so that with much difficulty he gained the delightful island of Juan Fernandez. Here he was joined by one ship and a frigate of seven guns. From thence sailing along the coast of Chili, he plundered and burnt the town of Païta. He next traversed the great Pacific ocean, in hopes of meeting with one of the immensely rich galleons that trade from the Philippine Islands to Mexico. Having refreshed his men at the island of Tinian, he set forward for China; and returning the same way he came, at last discovered the galleon. Her he engaged, and took; and with this prize, valued at 313,000*l.* together with other captures to the value of about as much more, he returned home after a voyage of three years. By this expedition the public sustained the loss of a fine squadron of ships, but a few individuals became possessed of immense fortunes.

401
Unsuccessful
attempt
on Cartha-
gena.

The other expedition ended still more unfortunately. The armament consisted of 29 ships of the line, and almost an equal number of frigates, furnished with all kinds of warlike stores, near 15,000 *flamens*, and as many land forces. The most sanguine hopes of success were entertained; but the ministry detained the fleet without any visible reason, till the season for action in America was almost over. At last, however, they arrived before the wealthy city of Carthage. They soon became masters of the strong forts which defended the harbour. But though by this means they advanced a good deal nearer the town, they found great difficulties still before them. It was asserted, that the fleet could not lie near enough to batter the town, and therefore the remaining forts must be attempted by escalade. This dangerous experiment was tried; the guides were slain by the enemies fire, and then the forces mistook their way. Instead of attempting the weakest place of the fort, they attacked the strongest, and where they were exposed to the fire of the whole town. Their scaling ladders were too short; and, at last, after bearing

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a dreadful fire with great resolution for some hours, they retreated, leaving 600 men dead on the spot. The terrors of the climate now began to be more dreadful than those of war. The rainy season commenced with such violence, that it was impossible for the troops to continue their encampment. To these calamities was added the dissension between the sea and land commanders, who blamed each other, and at last could be only brought to agree in one mortifying measure, *viz.* to re-embark the troops, and withdraw them as quick as possible.

The miscarriage of this enterprize produced the greatest discontents; especially as other causes of complaint were now joined with it. Sir John Norris had twice failed to the coasts of Spain at the head of a very powerful squadron, without doing any thing to the purpose. The commerce of Britain was greatly annoyed by the Spanish privateers, who had taken 407 ships since the commencement of the war; while the British fleets seemed to be quite inactive, and to suffer one loss after another, without endeavouring in the least to make proper reprisals. These discontents burst all at once upon Sir Robert Walpole; a majority in the house of commons was formed against him; he was created earl of Orford, the parliament being adjourned for a few days for that purpose; and he resigned all his employments.

The removal of this minister gave universal satisfaction. His antagonists entertained great hopes of seeing him punished; but he had laid his schemes too well to be under any apprehensions on that account; and what was worse, the new ministry were no sooner got in, than they trod in the footsteps of those they had so much exclaimed against. The nation had now become disgusted with naval operations. The people wished for a renewal of their victories in Flanders, and the king ardently joined in the same wish. An army of 16,000 men was therefore shipped over into Flanders, to take part in the quarrels that were then beginning on the continent. Immense triumphs were expected from this undertaking; but they forgot that the army was not now commanded by the duke of Marlborough.

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An army
sent into
Flanders.

In order to give some notion of the origin of these continental quarrels, it is necessary to go back for some years. After the duke of Orleans, who had been regent of France, died, cardinal Fleury undertook to settle the confusion in which the kingdom was then involved. Under him France repaired her losses, and enriched herself by commerce. During the long interval of peace which this minister's councils had procured for Europe, two powers, till now unregarded, began to attract the notice and jealousy of the neighbouring nations. These were Russia and Prussia. The other states were but little prepared to renew war. The empire remained under the government of Charles VI. who had been placed on the throne by the treaty of Utrecht. Sweden continued to languish from the destructive projects of Charles XII. Denmark was powerful enough, but inclined to peace; and part of Italy still remained subject to those princes who had been imposed upon it by foreign treaties.

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Origin of
the contin-
ental war.

All these states, however, continued to enjoy a profound peace, until the death of Augustus king of Poland, by which a general flame was once more kindled in Europe. The emperor, assisted by the arms of Rus-

ssia,

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fia, declared for the elector of Saxony, son to the deceased king. On the other hand, France declared for Stanislaus, who had long since been nominated king of the Poles by Charles of Sweden, and whose daughter the king of France had since married. Stanislaus was gladly received at Dantzic, and acknowledged king of Poland; but here he was besieged by 10,000 Russians, the city taken, and he himself with difficulty made his escape. France, however, still resolved to assist him, as this, it was thought, would be the most effectual method of distressing the house of Austria. These views of France were seconded by Spain and Sardinia, both of which hoped to grow rich by the spoils of Austria. A French army, therefore, over-ran the empire, under the conduct of the old marshal Villars; while the duke of Montemar, the Spanish general, was equally victorious in the kingdom of Naples. The emperor was soon obliged to sue for peace; which was granted, but Stanislaus was neglected in the treaty. It was stipulated that he should renounce all claim to the kingdom of Poland; for which the emperor gratified France with the duchy of Lorraine, and some other valuable territories.

405
Desperate
situation of
the queen of
Hungary.

The emperor dying in the year 1740, the French began to think this a favourable opportunity for exerting their ambition. Regardless of treaties, therefore, particularly that called the *Pragmatic Sanction*, by which the late emperor's dominions was settled upon his daughter, they caused the elector of Bavaria to be crowned emperor. Thus the queen of Hungary, daughter of Charles VI. was at once stripped of her inheritance, and was left for a whole year deserted by all Europe, and without any hopes of succour. At the same time she lost the province of Silesia by an irruption of the young king of Prussia, who took the opportunity of her defenceless state to renew his pretensions to that province, of which his ancestors had been unjustly deprived. France, Saxony, and Bavaria, attacked the rest of her dominions: Britain was the only ally that seemed willing to assist her; in which, however, Sardinia, Holland, and Russia, soon after concurred.

It must be owned that Britain had no other reason for interfering in these disputes, than that the security of the electorate depended upon nicely balancing the different interests of the empire; and the ministry were willing to gratify the king. His majesty informed the parliament, that he had sent a body of British forces into the Netherlands, which he had augmented by 16,000 Hanoverians, to make a diversion upon the dominions of France, in favour of the queen of Hungary. When the supplies came to be considered by which this additional number of Hanoverian troops was to receive pay from Britain for defending their own cause, most violent parliamentary debates ensued; but the ministry carried their point by the strength of numbers.

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Relieved by
the British
forces.

But, however prejudicial these continental measures might be to the true interests of Great Britain, they effectually relieved the queen of Hungary's desperate affairs, and soon began to turn the scale of victory on her side. The French were driven out of Bohemia. Her general, prince Charles, at the head of a large army, invaded the dominions of Bavaria. Her rival, the nominal emperor, was obliged to fly before her; and being abandoned by his allies, and stripped even of his hereditary dominions, retired to Frankfort, where he lived in obscurity.

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407
Battle of
Dettingen.

In the mean time, the British and Hanoverian army advanced, in order to effect a junction with that of prince Charles of Lorraine, in which case they would have outnumbered their enemies. To prevent this, the French opposed an army of 60,000 men, under the command of the marshal de Noailles, who posted his troops on the east side of that river. The British army was commanded by the earl of Stair, who had learned the art of war under the great prince Eugene; nevertheless, he suffered himself to be inclosed by the enemy on every side, near a village called *Dettingen*. In this situation, the whole army, with the king himself, who had by this time arrived in the camp, must have been taken, had the French behaved with prudence. Their impetuosity, however, saved the whole army. They passed a defile, which they ought to have contented themselves with guarding; and, under the conduct of the duke of Gramont, their horse charged the British foot with great fury. They were received with great resolution; and at last obliged to repass the Mayne with precipitation, and the loss of about 5000 men.

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Intended in-
vasion of
Britain by
the French.

Though the British were victorious in this engagement, the French were very little disconcerted by it. They opposed prince Charles, and interrupted his attempts to pass the Rhine. In Italy they also gained some advantages; but their chief hopes were placed on an intended invasion of England. From the violence of parliamentary disputes in England, France had been persuaded that the country was ripe for a revolution, and only wanted the presence of the pretender to bring about a change. An invasion was therefore actually projected. The troops destined for the expedition amounted to 15,000; and preparations were made for embarking them at Duunkirk, and some of the ports nearest to England, under the eye of the young pretender. The duke de Roquefeuille, with 20 ships of the line, was to see them safely landed on the opposite shore, and the famous count Saxe was to command them when landed. But the whole project was disconcerted by the appearance of Sir John Norris, who with a superior fleet made up to attack them. The French fleet was obliged to put back; a very hard gale of wind damaged their transports beyond redress; and the French, now frustrated in their scheme of a sudden descent, thought fit openly to declare war.

The national joy for Sir John Norris's success, however, was soon damped by the miscarriage of admirals Matthews and Lestock; who, thro' a misunderstanding between themselves, suffered a French fleet of 34 sail to escape them near Toulon. In the Netherlands the British arms were attended with still worse success. The French had there assembled an army of 120,000 men, commanded by count Saxe, natural son to the late king of Poland, an officer of great experience. The English were headed by the duke of Cumberland, who had an inferior army, and was much inferior in the knowledge of war to the French general. Count Saxe, therefore, carried all before him. In 1743, he besieged Fribourg; and in the beginning of the campaign 1744, invested the strong city of Tournay. To save this place, if possible, the allies resolved to hazard an engagement; and on this ensued the bloody battle of Fontenoy, in which the allies left on the field of battle near 12,000 men, and the French almost an equal number. In consequence of this victory, Tournay was soon after taken by the

409
Battle of
Fontenoy.

Britain.

the French. To balance this bad success, however, admirals Rowley and Warren had retrieved the honour of the British flag, and made several rich captures at sea. The fortresses of Louisbourg, a place of great consequence to the British commerce, surrendered to general Pepperell; while, a short time after, two French East-India ships, and a Spanish ship from Peru laden with treasure, put into the harbour, supposing it still their own, and were taken.

410
Louisbourg
taken.

411
Young pre-
tender lands
in Scotland.

During this gleam of returning success, Charles Edward, the son of the old pretender to the British crown, resolved to make an attempt to recover what he called his right. Being furnished with some money from France, he embarked by the marquis of Tullibardine, Sir Thomas Sheridan, and some others; and for the conquest of the whole British empire only brought with him seven officers, and arms for 2000 men.

Fortune, however, seemed no way more favourable to this attempt, than to others similar to it. His convoy, a ship of 60 guns, was so disabled in an engagement with an English man of war, that it was obliged to return to Breff, while he continued his course to the western parts of Scotland. On the 27th of July 1745, he landed on the coast of Lochaber, and was in a little time joined by the Highlanders, to the number of 1500: the ministry at first could scarcely be induced to credit his arrival; but when they could no longer doubt of it, they sent Sir John Cope with a small body of forces to oppose his progress.

412
Gains the
battle of
Preston-
pans.

By this time the young adventurer was arrived at Perth, where he performed the ceremony of proclaiming his father king of Great Britain. From thence, descending towards Edinburgh, and his forces continually increasing, he entered the capital without opposition; but was unable, for want of cannon, to reduce the castle. Here he again proclaimed his father; and promised to dissolve the union, which was considered as one of the national grievances. In the mean time, Sir John Cope being reinforced by two regiments of dragoons, resolved to give the enemy battle. The rebels attacked him near Prestonpans, and in a few minutes put him and his troops to flight, with the loss of 500 men.

This victory gave the rebels great influence; and had the pretender marched directly to England, the consequence might have been fatal to freedom. But he was amused by the promise of succours which never came; and thus induced to remain in Edinburgh till the season for action was lost. He was joined, however, by the earl of Kilmarnock, lord Balmerino, lords Cromarty, Elcho, Ogilvy, Pitligo, and the eldest son of lord Lovat, who with their vassals considerably increased his army. Lord Lovat himself, so remarkable for his treachery, was an enthusiast in favour of the pretender, but was unwilling to act openly for fear of the ministry. But while Charles was thus trifling away his time at Edinburgh, the British ministry were taking effectual methods to oppose him. Six thousand Dutch troops, that had come over to the assistance of the crown, were dispatched northward under the command of general Wade; but, as it was then said, these could lend no assistance, being prisoners of France upon their parole, and under engagements not to oppose that power for a year. But however this be, the duke of

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Cumberland soon after arrived from Flanders, and was followed by another detachment of dragoons and infantry, well disciplined and inured to action; and besides these, volunteers offered themselves in every part of the kingdom.

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At last, Charles resolved upon an irruption into England. He entered that country by the western border, and took the town of Carlisle; after which he continued his march southwards, having received assurances that a considerable body of forces would be landed on the southern coasts to make a diversion in his favour. He established his head-quarters at Manchester, where he was joined by about 200 English formed into a regiment, under the command of colonel Townley. From thence he pursued his march to Derby, intending to go by the way of Chester into Wales, where he hoped to be joined by a great number of malecontents; but in this he was prevented by the factions among his followers.

413
Invades
England.

Being now advanced within 100 miles of London, that capital was in the utmost consternation; and had he proceeded with the same expedition he had hitherto used, perhaps he might have made himself master of it. But he was rendered incapable of pursuing this, or any other rational plan, by the discontents which began to prevail in his army. In fact, the young pretender was but the nominal leader of his forces; his generals, the Highland chiefs, being averse to subordination, and ignorant of command. They were now unanimous in their resolution to return to their own country, and Charles was forced to comply. They retreated to Carlisle without any loss; and from thence crossing the rivers Eden and Solway, entered Scotland. They next marched to Glasgow, which was laid under severe contributions. From thence advancing to Stirling, they were joined by lord Lewis Gordon at the head of some forces which had been assembled in his absence. Other clans likewise came in; and from some supplies of money received from Spain, and some skirmishes with the royalists, in which he was victorious, the pretender's affairs began to wear a more promising aspect. Being joined by lord Drummond, he invested the castle of Stirling, in the siege of which much time was consumed to no purpose. General Hawley, who commanded a considerable body of forces near Edinburgh, undertook to raise this siege, and advanced towards the rebel army as far as Falkirk. After two days spent in mutually examining each others strength, an engagement ensued, in which the king's forces were entirely defeated, with the loss of their tents and artillery.

414
Great con-
sternation at
London.

415
Rebels re-
solve to re-
turn.

This was the end of all the triumphs of the rebel army. The duke of Cumberland having arrived, was put at the head of the troops at Edinburgh, which amounted to about 14,000 men. With these he advanced to Aberdeen, where he was joined by several of the nobility attached to the house of Hanover; the enemy in the mean time retreating before him. He next advanced to the banks of the Spey, a deep and rapid river, where the rebels might have disputed his passage; but their contentions with one another were now risen to such a height, that they could scarce agree in any thing. At last they resolved to wait their pursuers. An engagement ensued at Culloden*, near Inverness; in which the rebels were defeated with great slaughter, and a final end was put to all the hopes

416
Gain the
battle of
Falkirk.

417
Entirely de-
feated at
Culloden.

* See Culloden.
den.

Britain.

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of the young adventurer. The conquerors behaved with the greatest cruelty; refusing quarter to the wounded, the unarmed, and the defenceless; some were slain who had only been spectators of the combat, and soldiers were seen to anticipate the safe employment of the executioner. The duke, immediately after the action, ordered 36 deserters to be executed: the conquerors spread terror wherever they came; and after a short space, the whole country round was one dreadful scene of plunder, slaughter, and desolation.

419
Adventures
of the young
pretender.

Immediately after the engagement, the young pretender fled away with a captain of Fitzjames's cavalry; and when their horses were fatigued, they both alighted, and separately sought for safety. There is a striking resemblance between the adventures of Charles II. after the battle of Worcester, and those of the young pretender after the battle of Culloden. For some days he wandered in the country. Sometimes he found refuge in caves and cottages, without any attendants at all. Sometimes he lay in forests with one or two companions of his distress, continually pursued by the troops of the conqueror, there being a reward of 30,000 l. offered for taking him either dead or alive. In the course of his adventures, he had occasion to trust his life to the fidelity of above 50 individuals; not one of whom could be prevailed upon by so great a reward as was offered, to betray him whom they looked upon to be their king's son.

For six months the unfortunate Charles continued to wander in the frightful wilds of Glengary, often hemmed round by his pursuers, but still rescued by some providential accident from the impending danger. At length, a privateer of St Maloes, hired by his adherents, arrived in Lochanach, in which he embarked in the most wretched attire. He was clad in a short coat of black frize, thread-bare; over which was a common Highland plaid, girt round him by a belt, from which hung a pistol and dagger. He had not been shifted for many weeks; his eyes were hollow, his visage wan, and his constitution greatly impaired by famine and fatigue. He was accompanied by Sullivan and Sheridan, two Irish adherents who had shared all his calamities; together with Cameron of Lochiel, his brother, and a few other exiles. They set sail for France; and, after having been chased by two English men of war, arrived in safety at a place called *Rosseau* near Morlaix in Bretagne.

420
He escapes
to France.

420
Rebels ex-
ecuted.

While the pretender was thus pursued, the scaffolds and gibbets were preparing for his adherents. Seventeen officers were hanged, drawn, and quartered, at Kennington-common in the neighbourhood of London; nine were executed in the same manner at Carlisle, and eleven at York. A few obtained pardons, and a considerable number of the common men were transported to America. The earls of Kilmarnock and Cromarty, and lord Balmerino, were tried and found guilty of high treason. Cromarty was pardoned: but Kilmarnock and Balmerino were executed; as was also Mr Radcliffe brother to the late earl of Derwentwater, who was sentenced upon a former conviction. Lord Lovat was tried, and suffered some time after.

421
New regu-
lations in
Scotland.

Immediately after the suppression of the rebellion, the legislature undertook to establish several regulations in Scotland, which were equally conducive to the happiness of the people, and the tranquillity of the united

kingdoms. The Highlanders had till that time continued to wear the military dress of their ancestors, and never went without arms. In consequence of this, they considered themselves as a body of people distinct from the rest of the nation, and were ready, upon the shortest notice, to second the insurrections of their chiefs. Their habits were now reformed by an act of legislature, and they were compelled to wear clothes of the common fashion. But what contributed still more to their real felicity was the abolition of that hereditary jurisdiction which their chieftains exerted over them. The power of their chieftains was totally destroyed, and every subject in that part of the kingdom was granted a participation in the common liberty.

Soon after the battle of Culloden, the duke of Cumberland returned to Flanders, where he resumed the command of an army to which he was by no means equal. The French carried every thing before them; and they reduced under their dominion all those strong towns which had been taken by the duke of Marlborough, and formed a barrier to the United Provinces. They gained a considerable victory at Boucroux; which, however, cost them as many men as they destroyed of the enemy; but these they could more easily spare, as they were much more numerous. Another victory which they obtained at La Feldt, served to depress the allied army still lower. But the taking of Bergen-op-zoom, the strongest fortification of Brabant, reduced the Dutch to a state of desperation.

These victories and successes in Flanders were, however, counterbalanced by almost equal disappointments. In Italy, the marshal Belleisle's brother, attempting to penetrate, at the head of 34,000 men, into Piedmont, was defeated and killed. A fleet was fitted out for the recovery of Cape Breton, but without success. Two others were fitted out, the one to make a descent upon the British colonies in America, and the other to carry on the operations in the East Indies; but these were attacked by Anson and Warren, and nine of their ships taken. Soon after this, commodore Fox, with six ships of war, took above 40 French ships richly laden, from St Domingo; and soon after this the French fleet was defeated by admiral Hawke, who took seven ships of the line, and several frigates.

422
Allies de-
feated in
Flanders.

423
Loss of
the French
in other
parts.

424
Peace of
Aix la Cha-
pelle.

For a long time Lewis had been desirous of a general tranquillity; and this desire he had even expressed to Sir John Ligonier, who was taken prisoner at the battle of La Feldt. But now the bad success of his admirals at sea, his armies in Italy, the frequent bankruptcies of his merchants at home, and the election of a stadtholder in Holland who gave spirit to the opposition; all these contributed to make him weary of the war, and to propose terms of accommodation. This was what the allies had long wished for, but had been ashamed to demand. A congress, therefore, was held at Aix-la-Chapelle, where a treaty was concluded on the following terms. 1. That all prisoners on each side should be mutually given up, and all conquests restored. 2. That the duchies of Parma, Placentia, and Guastalla, should be ceded to Don Philip, heir apparent to the Spanish crown; after whom these dominions should return to the house of Austria. 3. That the fortifications of Dunkirk towards the sea should be demolished; and that the British ship annually sent with slaves to the coast of New Spain, should have this privilege continued for

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for four years. 4. That the king of Prussia should be confirmed in the possession of Silesia, and that the queen of Hungary should be secured in the possession of her patrimonial dominions. But the most mortifying clause was, that the king of Great Britain should immediately, after the ratification of this treaty, send two persons of rank to France as hostages, until restitution should be made of Cape Breton and all other British conquests made during the war. No mention was made of the searching British vessels in the American seas, tho' this was the original cause of the quarrel. The limits of their respective possessions in North America were not ascertained; nor did they receive any equivalent for those forts which they restored to the enemy.

415
Death of
the prince of
Wales.

In the year 1751, died Frederic prince of Wales, of a pleurisy thought at first to be no way dangerous. He was greatly regretted; for his good-nature had rendered him popular, and those who opposed the present administration had grounded all their hopes of redress upon his accession to the throne.

426
Hostilities
renewed.

Some time before this, viz. in the year 1749, a scheme was entered upon, which the nation in general imagined would be very advantageous. This was the encouraging those who had been discharged the army or navy to become settlers in Nova Scotia. This country is cold, barren, and almost incapable of cultivation. Nevertheless, on account of this barren spot, the English and French renewed the war, which soon after spread with such terrible devastation over every part of the globe. The possession of this country was reckoned necessary to defend the English colonies to the north, and to preserve their superiority in the fisheries in that part of the world. The French, however, who had been long settled in the back parts, resolved to use every method to dispossess the new comers, and spirited up the Indians to begin hostilities. Another source of dispute also sprung up soon after in the same part of the world. The French, pretending to have first discovered the mouth of the river Mississippi, claimed the whole adjacent country towards New Mexico on the east, quite to the Apalachian mountains on the west. In order to assert their claims, as they found several English who had settled beyond these mountains, they dispossessed them of their new settlements, and built such forts as would command the whole country round about.

Negotiations, mutual accusations, and hostilities, first took place between the two powers; at length, in 1756, four operations were undertaken by the British in America at once. Colonel Monkton had orders to drive the French from their encroachments upon the province of Nova Scotia. General Johnson was sent against Crown Point; General Shirley against Niagara, to secure the forts on the river; and General Braddock against Fort du Quesne. In these expeditions, Monkton was successful; Johnson also was victorious, though he failed in taking the fort against which he was sent; Shirley was thought to have lost the season of operation by delay; and Braddock was defeated and killed.

In return for this bad success, the British made reprisals at sea; and in this they were so successful, that the French navy was unable to recover itself during the continuance of the war that was shortly after declared on both sides. The first step of the French was to threaten an invasion. Several bodies of their troops

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were sent down to the coasts that lay opposite to the British shores; these were instructed in the manner of embarking and relanding from flat-bottomed boats, which were made in great numbers for that expedition. The number of men amounted to 50,000; but all discovered the utmost reluctance to the undertaking. The ministry were greatly alarmed. They applied to the Dutch for 6000 men, which they were by treaty obliged to furnish in case of an invasion. This supply was refused; the Dutch alleging, that their treaty was to send the troops in case of an actual, and not a threatened, invasion. The king, therefore, finding he could not have the Dutch forces till their assistance would be too late, desisted entirely from his demand; and the Dutch with great amity returned him thanks for withdrawing his request. Upon this, 10,000 Hessians and Hanoverians were brought over. But this occasioned great discontent. The ministry were reviled for such disgraceful condescension, as if the nation was unable to defend itself. The people only demanded a vigorous exertion of their own internal strength, and then feared no force that could be led to invade them.

417
The British invasion, however, never took place: but Minorca invaded.

A French army landed in Minorca, and invested the citadel of St Philip's, which was reckoned the strongest in Europe; but the garrison was weak, and no way fitted to stand a vigorous siege. To raise this siege, admiral Byng was dispatched with a squadron of ten men of war, with orders to relieve Minorca, or at any rate to throw a body of troops into the garrison. This last he reckoned too hazardous an undertaking; nor did he even attempt it. Soon after, a French fleet appeared nearly equal in force to his own; but the admiral resolved to act only upon the defensive. The French advanced; a slight engagement ensued with part of the English fleet; after which, the French slowly sailed away, and another opportunity never occurred of coming to a closer engagement. After this, it was resolved in a council of war to return to Gibraltar to rest, and that the relief of Minorca was impracticable. For this conduct Byng was brought home under arrest, tried, and sentenced to death. His sentence was to be 418
Admiral shot; and he suffered with the greatest resolution, after delivering a paper filled with protestations of his innocence as to any treacherous intention. executed.

After the conquest of Minorca, the French declared that they would revenge all injuries they should sustain in their colonies on the king of Britain's dominions in Germany. Upon this, the court of London, eager to 419
Treaty with preserve Hanover, entered into a treaty with the court Russia, of Russia, by which it was stipulated, that a body of 50,000 Russians should be ready to act in the British service, in case Hanover should be invaded by the French. For this the czarina was to receive 100,000l. annually, to be paid in advance. This treaty was opposed by the king of Prussia. He had long considered himself as guardian of the interests of Germany, and was therefore alarmed at a treaty which threatened to deluge the empire with an army of barbarians. Besides, he was already apprized of an agreement between the Austrians and Russians, by which the latter were to enter the empire and strip him of his late conquest of Silesia. He 420
Opposed by therefore declared, that he would not suffer any foreign king of Prussia. forces to enter the empire, either as auxiliaries or principals. The king of Britain now found himself obliged

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431
New combination of the European powers.

to drop his Russian connection, and conclude a treaty with the king of Prussia. As both monarchs wished only to prevent the invasion of Germany, they soon came to an agreement to assist each other mutually. From this alliance a new combination took place among the European powers, quite opposite to the former; and their forces were drawn out in the following manner. Britain opposed France in America, Asia, and on the ocean. France attacked Hanover; which the king of Prussia undertook to protect, while Britain promised him troops and money to assist his operations. Austria had their aims on the dominions of Prussia, and drew the elector of Saxony into the same designs. In these views the Austrians were seconded by France, Sweden, and Russia, who had hopes of acquiring a settlement in the west of Europe.

432
Unsuccessful expedition France.

Thus the king of Prussia launched into the tumult of war, having only the king of Britain for his ally, while the most potent states of Europe were his antagonists. He now performed exploits perhaps unequalled in the annals of modern ages; for a particular account of which, see the article PRUSSIA. The British ministry, in order to procure a diversion in his favour, planned an enterprize against the coast of France. The destination of the fleet equipped for this purpose was kept a profound secret. At last it appeared before Rochford; where the commanders, having trifled away their time in deliberating how to proceed, secured the little island of Aix, an easy and an useless conquest: soon after which, they returned home, without attempting any thing else. By this miscarriage the ministry were so discouraged, that they had thoughts of abandoning the king of Prussia to his fate; and the king was actually meditating a negotiation of this nature, when he was prevented by the expostulations of his distressed ally. From motives of generosity, therefore, more than of interest, it was resolved to continue to assist him; and success, which had long fled from the British arms, once more began to return with double splendour.

433
British success in the East Indies.

It was in the East Indies where this returning success first began to appear. The war in Asia had never been totally suspended. It was carried on at first by both nations under pretence of lending assistance to the contending chiefs of the country; but the allies soon became the principals in the contention. This war at first, and for a long time after the treaty of Aix-la-Chapelle, was protracted with doubtful success; but at length the affairs of the English seemed to gain the ascendancy by the courage and conduct of Mr Clive. By his activity the province of Arcot was first cleared. Soon after, the French general was taken prisoner; and the nabob whom the English supported was re-instated in the government of which he had been formerly deprived. Upon this, the French sent over a commissary to Europe to restore peace. A convention between the two companies was accordingly concluded, importing, that the territories taken on either side since the conclusion of the last peace should be mutually restored; that the nabobs advanced by the influence of either party should be acknowledged by both; and that, for the future, neither should interfere in the differences that should arise between the princes of the country. This tranquillity, however, was of short duration. In a few months both sides renewed their opera-

tions, no longer under the name of auxiliaries, but as rivals in arms, government, and commerce. The most powerful prince in that country declared war against the British; and, levying a numerous army, laid siege to Calcutta, one of the principal British forts in that part of the world, but which was not in a condition to defend itself even from these barbarians. But, for a particular account of the miserable fate of this place, and the subsequent transactions there, see BENGAL, n° 10, & seq.; and CALCUTTA.

Clive, having fully revenged the loss sustained at Calcutta, and made the power of the British irresistible over all the peninsula of India, the French ministry were greatly alarmed. To make some sort of opposition, a considerable body of forces was sent out under the command of general Lally; and for some time the affairs of France seemed to wear a better aspect from his conduct. He took Fort St David's; plundered the country of the king of Tanjour in alliance with the British; and then, entering the province of Arcot, prepared for laying siege to Madras; but in this enterprize he miscarried through the cowardice of his soldiers. These successes, however, were of short duration. The British troops, headed by colonel Coote a native of Ireland, marched against Lally, with a design to come to a decisive engagement. On his march, Coote took the city of Wandewash, and afterwards reduced the fortress of Carangoly. At length he came up with the French general, who had no thoughts of declining an engagement. In the morning early, the French advanced within three quarters of a mile of the British line; and the cannonading began with great fury on both sides. The engagement continued till two in the afternoon; when the French gave way and fled towards their camp; which they quickly after abandoned, leaving all their cannon and baggage to the victors.

434
General Lally defeated.

The retaking the city of Arcot was the consequence of this victory; so that nothing now remained to the French, of all their Indian dominions, but the strong town of Pondicherry and some adjacent fortresses. Coote began with reducing the forts in its neighbourhood; after which, he sat down before the city. Lally held out to the last extremity, but was at length obliged to capitulate; and thus a final period was put to the power of France in the East Indies.

435
Pondicherry taken.

The British conquests in the western part of the world were about this time still more splendid than those in the east. But these successes must, partly at least, be ascribed to the vigorous administration of Mr William Pitt, who about this time came into power. An expedition was set on foot against Cape Breton, under general Amherst and admiral Boscawen; another, under general Abercrombie, against Crown Point and Ticonderago; and a third, under brigadier-general Forbes, against Fort du Quesne. The fortress of Louisbourg, which defended the island of Cape Breton, was very strong both by nature and art; the garrison was numerous, the commander vigilant, and every precaution had been taken to prevent a landing. But the activity of the British surmounted every obstacle; the place was surrendered by capitulation, and its fortifications were demolished. The expedition against Fort du Quesne was equally successful; but that against Crown Point once more miscarried. General Abercrombie attacked the French in their entrenchments, was repulsed with

436
Mr Pitt comes into power.

great

Britain.

Britain.

great slaughter, and obliged to retire to his camp at Lake George. But though in this respect the British arms were unsuccessful, yet, upon the whole, the campaign of 1758 was greatly in their favour. The taking of Fort du Quebec served to remove from their colonies the terror of the incursions of the Indians, while it interrupted the correspondence along a chain of forts with which the French had environed the British settlements in America, so that the succeeding campaign promised great success.

In 1759, it was resolved to attack the French in several parts of their empire at once. General Amherst with a body of 12,000 men was commanded to attack Crown Point; General Wolfe was to undertake the siege of Quebec; while general Prideaux and Sir William Johnson were to attempt a French fort near the cataracts of Niagara. This last expedition was the first that succeeded. The siege was begun with vigour, and promised an easy conquest; but general Prideaux was killed in the trenches by the bursting of a mortar, so that the whole command devolved on general Johnson. A body of French troops, sensible of the importance of the place, attempted to relieve it; but were utterly defeated and dispersed: soon after which, the garrison surrendered prisoners of war. On his arrival at the forts at Crown Point and Ticonderago, general Amherst found them deserted and destroyed. There now remained, therefore, but one decisive blow to reduce all North America under the British dominion; and this was by the taking of Quebec, the capital of Canada. This expedition was commanded by admiral Saunders and general Wolfe. The enterprise was attended with difficulties which appeared insurmountable; but all these difficulties were got over by the conduct of general Wolfe, and the bravery of his men. He engaged and put to flight the French under Montcalm; but to the great regret of the British, their general was killed in the action. The surrender of Quebec was the consequence of this victory, which was soon followed by the cession of all Canada. The following season, indeed, the French made a vigorous effort to recover the city; but by the resolution of governor Murray, and the appearance of a British fleet under the command of lord Colville, they were obliged to abandon the enterprise. The whole province was soon after reduced by the prudence and activity of general Amherst, who obliged the French army to capitulate, and it has since remained annexed to the British empire. About the same time also the island of Guadalupe was reduced by commodore More and general Hopson.

The British affairs in Germany had at the beginning of the war worn a very unfavourable aspect. The Hanoverians were commanded by the duke of Cumberland, who was greatly outnumbered by the enemy. He was driven beyond the Weser, the passage of which might have been disputed with some appearance of success; but the French were suffered to pass it unmolested. The Hanoverians were driven from one part of the country to another, till at length it made a stand near a village called *Hasenback*, where it was hoped the numbers of the enemy would have the least opportunity of coming to a general engagement. The Hanoverians, however, left the field of battle to the French, after a faint resistance. Their enemies pursued, and the duke retired towards Stade; by which means he

marched into a country from whence he could neither procure provisions, nor attack the enemy with any hopes of success. Here, being unable either to escape or advance, he was compelled to sign a capitulation by which the whole army laid down their arms, and were dispersed into different quarters of cantonment. By this remarkable capitulation, which was called the *capitulation of Closser Seven*, Hanover was obliged to submit quietly to the French, who were now determined to turn their arms against the king of Prussia.

Soon after this capitulation, both sides began to complain that the treaty was not strictly observed. The Hanoverians exclaimed against the rapacity of the French general, and the brutality of his soldiers. The French retorted the charge against them; accused them of insolence and insurrection; and, being sensible of their own superiority, resolved to bind them strictly to their terms of agreement. The Hanoverians only wanted a pretence to take arms, and a general to head them. Neither were long wanting. The oppressions of the tax-gatherers whom the French had appointed, were considered as so severe, that the army rose to vindicate the freedom of their country, while Ferdinand, prince of Brunswick, put himself at their head. As soon as this was known in Britain, large supplies were granted both for the service of the king of Prussia, and to enable the Hanoverian army to act vigorously in conjunction with him. A small body of British forces was sent over to join prince Ferdinand under the duke of Marlborough. After some considerable successes at Creveld, the duke of Marlborough dying, the command of the British forces devolved on lord George Sackville. A misunderstanding arose between him and prince Ferdinand, which appeared at the battle of Minden that was fought shortly after. Lord George pretended that he did not understand the orders sent him by the prince, and of consequence did not obey them. The allies gained the victory, which would have been more decisive had the British commander obeyed his orders. He was soon after recalled, tried by a court-martial, found guilty of disobedience, and declared incapable of serving in any military command for the future.

After this victory it was imagined, that one reinforcement more of British troops would terminate the war in favour of the allies; and that reinforcement was quickly sent. The British army in Germany was augmented to upwards of 30,000 men, and sanguine hopes of conquest were generally entertained. These hopes, however, were soon found to be ill founded. The allies were defeated at Corbach; but retrieved their honour at Exdorf. A victory at Warbourg followed shortly after, and another at Zierenberg: but then they suffered a defeat at Compen; after which, both sides retired into winter-quarters.

On the 25th of October 1760, happened the death of king George II. He had risen at his usual hour, and observed to his attendants, that as the weather was fine, he would take a walk into the gardens of Kensington, where he then resided. In a few minutes after his return, being left alone, he was heard to fall down upon the floor. The noise of this bringing his attendants into the room, they lifted him into bed; where he expired with a faint voice, that the princess Amelia might be sent for: but before she could reach

437
Quebec taken and Canada reduced.

* See Quebec.

439
Duke of Cumberland capitulates with the French.

439
The Hanoverians take up arms.

440
French defeated at Minden.

441
German war continued with various success.

442
Death of king George II.

the

Britain.

the apartment, he expired, in the 77th year of his age, and 33^d of his reign. An attempt was made to bleed him, but without effect; and afterwards the surgeons, upon opening him, discovered that the right ventricle of the heart was ruptured, and a great quantity of blood discharged through the aperture.

443
Great suc-
cess of the
British
arms.

King George III. ascended the throne amidst the greatest successes both by sea and land. At this time, indeed, the efforts of Britain in every quarter of the globe were truly astonishing. The king of Prussia received a subsidy; a large body of English forces commanded the extensive peninsula of India; another army of 20,000 men confirmed their conquests in North America; 30,000 men were employed in Germany; and a great many more were dispersed in the different garrisons in different parts of the world: but all this was surpassed by the astonishing naval force, which carried command wherever it came, and had totally annihilated the French maritime power. The courage and conduct of the English admirals excelled every thing that had been heard of before; neither superior force nor number, nor even the terrors of the tempest, could intimidate them. Admiral Hawke gained a complete victory over an equal number of French ships, in Quiberon bay on the coast of Bretagne, in the midst of a tempest, during the darkness of night, and, what a seaman fears still more, in the neighbourhood of a rocky shore.

As soon as his present majesty had met with his parliament, which was on November 18th 1760, he confirmed the hopes of his allies, and gave assurances of his intentions to prosecute the war with vigour. By this time, however, the people were in some measure weary with conquests; especially with those in Germany, from which they could never hope for any solid advantage, and which were gained at an immense expence to the nation. Disputes concerning the propriety of the German war were carried on, and the general run of popular opinion seemed to be rather against than for it. For some time, however, no change took place in the method of carrying on the war. In 1761, proposals of peace were made between the belligerent powers of Europe; and for this purpose Mr Stanley was sent to Paris, and Mr Bussy to London: but the French, desirous to draw Spain into a confederacy with them, seem not to have been sincere in their intentions; and thus the treaty came to nothing. An enterprize was projected against the island of Belleisle, near the coast of France, which was conducted by commodore Keppel and general Hodgson†. The place was conquered, with the loss of 1800 men killed and wounded on the part of the British; and however unimportant this conquest might be, the rejoicings on account of it were great. In Germany the campaign was unsuccessful on the part of the allies. At first, indeed, they drove the French quite out of the territory of Hesse, and laid siege to the city of Cassel; but being defeated at Stangerode, they were forced to raise the siege, retire behind the Dymel, and again abandon Hesse to their enemies. Here they were followed and attacked by the French; who, though defeated in that attempt, were with difficulty prevented from making themselves masters of Munster and Brunswick.

All this time an appearance of negotiation had been carried on; but at last the French having brought their designs with the court of Spain to a bearing, Mr

Bully delivered to Mr Pitt a private memorial, signifying, that, in order to establish the peace on a lasting foundation, the king of Spain might be induced to guaranty the treaty; and to prevent the differences which then subsisted between Britain and Spain from producing a fresh war in Europe, he proposed, that in this negotiation, the three points which had been disputed between the crowns of England and Spain might be finally settled. First, the restitution of some captures made upon the Spanish flag. Secondly, the privilege of the Spanish nation to fish upon the banks of Newfoundland. Thirdly, the demolition of the English settlements made in the bay of Honduras. This memorial was returned as wholly inadmissible. Mr Pitt declared, that it would be looked upon as an affront to the dignity of his master, and incompatible with the sincerity of the negotiation, to make any further mention of such a circumstance.

Mr Pitt, being now thoroughly convinced of the sinister designs of Spain, proposed immediately to declare war against that kingdom. But this proposal being rejected, he immediately resigned his employment of secretary of state; after which, he was created earl of Chatham, and had a pension of 3000*l.* per annum settled upon him for three lives.

Soon after this, however, the new administration found that Mr Pitt was in the right, and war was declared between Great Britain and Spain. As Portugal was a useful ally of Britain, it was resolved by the French and Spaniards to attack that kingdom, which was then in no capacity of defending itself. The Portuguese monarch was by the most haughty memorials commanded to accede to the confederacy against Britain, and threatened with the vengeance of France and Spain in case of a refusal. It was in vain that he promised to observe a strict neutrality, and urged the obligations he was under to the king of Britain; this moderate and reasonable reply only drew on more haughty and insulting answers. His Portuguese majesty, however, continued to reject their proposals in the most resolute manner; and concluded his last declaration with these words, that "it would affect him less, though reduced to the last extremity of which the great Judge is the sole arbiter, to let the last tile of his palace fall, and to see his faithful subjects spill the last drop of their blood, than to sacrifice, together with the honour of his crown, all that Portugal holds most dear, and to submit, by such extraordinary means, to become an unheard of example to all pacific powers, who will no longer be able to enjoy the benefit of neutrality, whenever a war shall be kindled between other powers with which the former are connected by defensive treaties." This declaration was made on the 27th of April 1762; and soon after, France and Spain jointly declared war against Portugal.

As the design of the courts of France and Spain in making war with Portugal, was professedly to prevent Great Britain from the military and commercial use of the ports of that kingdom, their principal endeavours were aimed at the two great ports where the British used to reside, *viz.* Oporto and Lisbon. With this view, three inroads were to be made; one to the north; another more to the south; while the third was made in the middle provinces, in order to sustain these two bodies, and preserve a communication between them.

The

Britain.

445
Spanish war
propagated by
Mr Pitt.

446
He resigns,
and is created
earl of
Chatham.

447
War with
Spain.

448
Proposals of
peace.

* See Belle-
isle.

449
France and
Spain de-
clare war a-
gainst Por-
tugal.

449
Portugal in-
vaded.

Britain.

The first body of troops was commanded by the marquis of Savria; and entered the north-east angle of Portugal, marching towards Miranda. This town might possibly have retarded their progress, had not a powder-magazine been blown up by accident; and the Spaniards entered on the ninth of May by the breaches made by this explosion. From thence they marched to Braganza, which surrendered six days after Miranda. Moncorvo was taken in like manner; every thing was clear before them to the banks of the Douro; and they became masters of almost the whole extensive province of Tralos Montes. Oporto was given up for lost, and the British admiralty prepared transports to carry off the effects of the British merchants. On the banks of the Douro, however, the career of this body was stopped. The peasants, animated, and guided by some British officers, seized a difficult pass, and drove the enemy back to Moncorvo.

The second body of Spaniards entered the province of Beira, at the villages called *Val de Mula* and *Val de Coelha*. They were joined by strong detachments amounting to almost the whole army in Tralos Montes; and immediately laid siege to Almeida, the strongest and best provided place on the frontiers of Portugal. This place was defended with sufficient resolution; but, like the rest, was obliged to surrender on the 25th of August. The Spaniards then over-ran the whole territory of Castel Branco, a principal district of the province of Beira, making their way southward until they approached the banks of the Tagus. During the whole of their progress, and indeed during the whole of the campaign, the allied troops of Great Britain and Portugal had nothing that could be called an army in the field, and they could not think of opposing the enemy in a pitched battle. All that could be done was by the defence of passes, skirmish, and surprise.

By this time the count of la Lippe Buckeburg had arrived in Portugal, to the inexpressible joy of the whole nation. The third Spanish army had assembled on the frontiers of Estremadura, with a design to invade the province of Alentejo; and had this body of troops been joined to the others, they would probably, in spite of all opposition, have forced their way to Lisbon itself; had it acted separately, it might have greatly distracted the defendants, so as to enable some other body of forces to penetrate to that city. The count, therefore, resolved to prevent their entrance into the kingdom; and with this view dispatched brigadier-general Burgoyne to attack an advanced body of Spaniards which lay on their frontiers, in a town called *Valentia de Alcantara*. On the 27th of August, the town was surprised; the general was taken who intended to have commanded in the invasion, together with one colonel, two captains, and 17 subaltern officers. One of the best regiments in the Spanish service was also entirely destroyed; and thus the enemy were in all probability prevented from entering Alentejo.

That part of the Spanish army which acted in the territory of Castel Branco had made themselves masters of several important passes, which they obliged some bodies of Portuguese to abandon. The combined army of British and Portuguese pretended to retire before them, in order to draw them into the mountainous tracts. They attacked the rear of the allies, but were

repulsed with loss. Still, however, they continued masters of the country, and nothing remained but the passage of the Tagus to enable them to take up their quarters in the province of Alentejo. This the count designed to prevent; and in this service general Burgoyne was employed, who formed a design of surprising them. The execution was committed to colonel Lee, who, in the night of October 6th, fell upon their rear, dispersed the whole body with considerable slaughter, destroyed their magazines, and returned with scarce any loss. The season was now far advanced; immense quantities of rain fell; the roads were destroyed; and the Spaniards, having seized no advanced posts where they could maintain themselves, and being unprovided with magazines for the support of their horse, every where fell back to the frontiers of Spain.

No less successful were the British arms in America, and the East Indies. From the French were taken the islands of Martinico, St Lucia, St Vincent, and Granada; from the Spaniards, the strong fortresses called *Havannah*, in the island of Cuba. By the acquisition of the first mentioned islands, the British became the sole and undisturbed possessors of all the Caribbees, and held that chain of innumerable islands which forms an immense bow, extending from the eastern point of Hispaniola almost to the continent of South America.

The conquest of the Havannah cost a number of brave men; more of whom were destroyed by the climate than the enemy *. It was in this place that the fleets from the several parts of the Spanish West Indies, called the *galloons* and *flotas*, assembled, before they finally set out on their voyage for Europe. The acquisition of this place, therefore, united in itself all the advantages which can be acquired in war. It was a military advantage of the highest class; it was equal to the greatest naval victory, by its effect on the enemy's marine; and in the plunder it equalled the produce of a national subsidy. Nine of the enemy's men of war, with four frigates, were taken; three of their capital ships had been sunk in the harbour at the beginning of the siege; two more were on the stocks in great forwardness, and these were destroyed. In money and valuable merchandizes, the plunder did not fall short of 3,000,000 l. sterling. To this success in the western part of the world may be added the capture of the Spanish register-ship called the *Hermione*, by the Antillean privateer. This happened on the 21st of May 1762, just as she was entering one of the ports of Old Spain, and the prize was little short of 1,000,000 l. sterling.

In the East Indies an expedition was undertaken against the Philippine islands, which was committed to colonel Draper, who arrived for this purpose at Madras, in the latter end of June 1762. The 79th regiment was the only regular corps that could be spared for this service. Every thing was conducted with the greatest celerity and judgment. The British forces landed on Manila on the 24th of September; on the 6th of October the governor was obliged to surrender at discretion; and soon after, the galleon bound from Manila to Acapulco, laden with rich merchandise, to the value of more than half a million, was taken by two frigates called the *Argo* and *Panther*. By the conquest of Manila, 14 considerable islands fell into the hands of the British; which from their extent, fertility, and

Britain.

451
And by co-
lonel Lee.

452
Havannah,
&c. taken.

* See Ha-
vannah.

453
Immense
plunder
found in the
place.

454
Capture of
the Her-
mione.

455
Philippines
reduced.

456
Manila gal-
leon taken.

con-

450
Spaniards
defeated by
general Bur-
goyne.

convenience of commerce, furnished the materials of a great kingdom. By this acquisition, joined to our former successes, we secured all the avenues of the Spanish trade, and interrupted all communications between the parts of their vast but unconnected empire. The conquest of the Havannah had cut off, in a great measure, the intercourse of their wealthy continental colonies with Europe: the reduction of the Philippines excluded them from Asia; and the plunder taken was far more than sufficient to indemnify the charges of the expedition; a circumstance not very common in modern wars. It amounted to upwards of a million and a half; of which the East India company, on whom the charge of the enterprise in a great measure lay, were by contract to have a third part.

457
Vast extent
of the Brit-
ish domi-
nions.

All this time the war in Germany had continued with the utmost violence; the allies under prince Ferdinand had continued to give the highest proofs of their valour, but no decisive advantage could be obtained against the French. It was, however, no longer the interest of Britain to continue a destructive war. There never had been a period so fortunate or glorious to this island. In the course of this war she had conquered a tract of continent of immense extent. Her American territory approached to the borders of Asia, and came near to the frontiers of the Russian and Chinese dominions. She had conquered 25 islands, all of them distinguishable for their magnitude, their riches, or the importance of their situation. By sea or land she had gained 12 battles, had reduced 9 fortified cities, and near 40 castles and forts. She had taken or destroyed above 100 ships of war from her enemies, and acquired at least 10,000,000 l. in plunder.

By such unexampled and wide extended conquests, it is no wonder that the French and Spaniards were desirous of a peace; which was at length concluded at Paris on the 10th of February 1763. The terms granted them were by many thought too favourable. The principal of them were, That the French king should relinquish all claims to Nova Scotia: that he should likewise give up all the country of Canada; and that for the future the boundary betwixt the British and French dominions in America should be fixed by a line drawn along the middle of the river Mississippi from its source to the river Iberville, and from thence drawn by a line along the middle of this river, and the lakes Maurepas and Pontchartrain, to the sea. The islands of St Pierre, Miquelon, Martinico, Guadaloupe, Marigalante, Desfrade, St Lucia, and Belleisle, were restored to France: Minorca, Granada, and the Grenadines, St Vincent, Dominica, and Tobago, were ceded to Britain. In Africa, the island of Goree was restored to France; and the river Senegal, with all its forts and dependencies, ceded to Great Britain. In the East Indies, all the forts and factories taken from the French were restored. In Europe, the fortifications of Dunkirk were to be destroyed; and all the countries, fortresses, &c. belonging to the electorate of Hanover, the duke of Brunswick, and the count of La Lippe Buckeburg, restored. With regard to Spain, the British fortifications on the bay of Honduras were to be demolished; and the Spaniards were to desist from their claim of a right to fish on the Newfoundland bank. The Havannah was restored; in consequence of which, Florida, St Augustine, and the bay of Pensacola, were ceded to Britain,

458
Articles of
the peace in
1763.

and the Spaniards were to make peace with Portugal: all other countries not particularly mentioned were to be restored to their respective owners at the beginning of the war.

Now BRITAIN, a large country of North America, called also *Terra Labrador*, has Hudon's bay and strait, on the north and west; Canada and the river St Lawrence, on the south; and the Atlantic ocean, on the east. It is subject to Great Britain, but yields only skins and furs. The following is the best description of this country that hath yet appeared. It was drawn up by the commander of the Otter sloop, and communicated to the royal society by the honourable Daines Barrington in 1774.

Phil. Trans.
Vol. LXXIV.
p. 372.

"There is no part of the British dominions so little known as the immense country of Labradore. So few have visited the northern parts of this vast country, that almost from the straits of Belleisle until you come to the entrance of Hudon's bay, for more than ten degrees of latitude, no chart which can give any tolerable idea of the coast hath been hitherto formed. The barrenness of the country explains why it has been so seldom frequented. Here avarice has but little to feed on.

"Perhaps without an immoderate share of vanity, I may venture to presume, that as far as I have been, which is to the latitude of 59. 10. the draught which I have been able to form is by much the best of any that has hitherto been made.

"Others have gone before me blest with abilities superior to mine, and to whom I hope to be thought equal only in assiduity. But I had advantages of which they were destitute: with a small vessel, and having an Indian with me, who knew every rock and shoal upon the coast, I was enabled to be accurate in my observations; and these are the reasons why I deem my own sketch preferable to all others.

"As this country is one of the most barren in the whole world, so its sea-coast is the most remarkable. Bordered by innumerable islands, and many of them being a considerable distance from the main land, a ship of burden would sail a great way along the coast without being able to form any notion of its true situation.

"Hence it is that all charts of it have been so extremely erroneous; and hence arose those opinions that some of the inlets extended a vast distance into the country, if not quite into the sea of Hudon's bay.

"Davis's inlet, which has been so much talked of, is not 20 leagues from the entrance of it to its extremity.

"The navigation here is extremely hazardous. Towards the land, the sea is covered with large bodies and broken pieces of ice; and the farther you go northward, the greater is the quantity you meet with.

"Some of those masses, which the seamen call *islands of ice*, are of a prodigious magnitude; and they are generally supposed to swim two thirds under water. You will frequently see them more than 100 feet above the surface; and to ships in a storm, or in thick weather, nothing can be more terrible.

"Those prodigious pieces of ice come from the north, and are supposed to be formed by the freezing of cataracts upon the lands about East Greenland and the pole. As soon as the severity of the winter begins to abate, their immense weight breaks them from the shore, and they are driven to the southward. To the miserable

miserable inhabitants of Labradore their appearance upon the coast serves as a token of the approach of summer.

" This vast tract of land is extremely barren, and altogether incapable of cultivation. The surface is every where uneven and covered with large stones, some of which are of amazing dimensions. There are few springs; yet throughout the country there are prodigious chains of lakes or ponds, which are produced by the rains and the melting of the snow. These ponds abound in trout, but they are very small.

" There is no such thing as level land. It is a country formed of frightful mountains, and unfruitful valleys. The mountains are almost devoid of every sort of herbage. A blighted shrub and a little moss is sometimes to be seen upon them, but in general the bare rock is all you behold. The valleys are full of crooked low trees, such as the different pines, spruce, birch, and a species of cedar. Up some of the deep bays, and not far from the water, it is said, however, there are a few sticks of no inconsiderable size. In a word, the whole country is nothing more than a prodigious heap of barren rocks.

" The climate is extremely rigorous. There is but little appearance of summer before the middle of July; and in September the approach of winter is very evident. It has been remarked, that the winters within these few years have been less severe than they have been known heretofore. The cause of such an alteration it would be difficult to discover.

" All along the coast there are many rivers that empty themselves into the sea, yet there are but few of any consideration; and you must not imagine that the largest are any thing like what is generally understood by a river. Custom has taught us to give them this appellation; but the greatest part of them are nothing more than broad brooks or rivulets. As they are only drains from the ponds, in dry weather they are every where fordable; for, running upon a solid rock, they become broad without having a bed of any depth below the surface of the banks.

" The superficial appearance of this country is extremely unfavourable. What may be hidden in its bowels, we cannot pretend to suggest: probably it may produce some copper; the rocks in many places are impregnated with an ore of that resemblance. Something of a horny substance which is extremely transparent, and which will scale out into a multitude of small sheets, is often found amidst the stones; there are both black and white of this sort, but the black is the most rare. It has been tried in fire, but seems to be noways affected by heat.

" The species of wood here are not very various: excepting a few shrubs which have as yet received no name from the Europeans, the principal produce of the country is the different sorts of spruce and pine. Of these, even in the more southern parts, there is not abundance; as you advance northwards they gradually diminish; and by the time you arrive at the 60th degree of latitude, the eye is not delighted with any sort of herbage. Here the wretched residents build their miserable habitations with the bones of whales. If ever they cheer their aching limbs with a fire, they gather a few sticks from the sea shore, which have probably been washed from Norway or Lapland. Here a vast quan-

tity of snow remains upon the land throughout the year.

" Although the winter here is so excessively rigid, in summer the heat is sometimes disagreeable; and in that season the weather is very moderate, and remarkably serene. It is but seldom foggy, speaking comparatively, between this and Newfoundland; nor are you so frequently liable to those destructive gales of wind which visit many other parts of the globe.

" It is in general high land, and sometimes you meet with mountains of an astonishing height; you are also frequently presented with prospects that are really awful, and extremely romantic.

" The inhabitants of New Britain are called *Eskimaux*; for a particular account of whom, see the article *ESKIMAUX*.

BRITANNICA, in botany, the trivial name of the rumex aquaticus. See *RUMEX*.

BRITANNICUS, son to the emperor Claudius by Messalina, was excluded from the empire after his father had married Agrippina; who put her son Nero on the throne, and caused Britannicus to be poisoned, A. D. 55.

BRITANNICUS, an Italian, one of the best humanists of the 15th century, was born at Brescia. He published notes on Persius, Juvenal, Terence, Statius, and Ovid. He died in 1510.

BRITE, or **BRIGHT**, in husbandry. Wheat, barley, or any other grain, is said to *brite*, when it grows over ripe and shatters.

BRITTANY, or **BRETAGNE**, a considerable province of France, which is 150 miles in length, and 112 in breadth. It is a peninsula, surrounded on all sides by the ocean, except on the east where it joins to Anjou, Maine, Normandy, and Poitou. It is divided into the upper and lower; and therein are large forests. It carries on a great trade, by reason of the many harbours on its coasts. It was united to the crown of France in 1532. Rennes is the capital town.

BRITTLENESS, that quality of bodies on account of which they are denominated *brittle*, or which subjects them to be easily broken by pressure or percussion.

Brittle bodies are extremely hard; a very small percussion exerts a force on them equivalent to the greatest pressure, and thus may easily break them. This effect is particularly remarkable in glass suddenly cooled, the brittleness of which is thereby much increased. Tin, though in itself tough, gives a brittleness to all the other metals when mixed therewith. The brittleness of glass has been said to arise from the heterogeneity of the parts whereof it is composed, as salt and sand can never bind sufficiently together: but this cannot be the case; for the pure calces of metals, or any other simple substances when vitrified, become brittle also. In timbers, brittleness seems to be connected with durability; the more brittle any sort of wood is, the more durable it is found. Thus oak is of very long duration; while beech and birch, as being tough, presently rot, and are of little service in building.

BRITTON (Thomas), the famous musical small-coal-man, was born at Higham Ferrers in Northamptonshire. He served his time in London, where he set up in a stable, next door to the little gate of St John of Jerusalem, on Clerkenwell-green, which he converted into a house. Here, getting acquainted with Dr Ga-

Briton.

renciers his near neighbour, he became an excellent chemist, constructing a moveable laboratory which was much admired by all who saw it. His skill in music was noways inferior to that in chemistry, either in the theory or practice: he had for many years a well frequented musical club, meeting at his own little cell; and was as well respected as known by persons of the first quality; being, above all, a valuable man in his moral character. In Ward's account of clubs, we are told, that "Britton's was first begun, or at least confirmed, by Sir Roger L'Estrange, a very musical gentleman; and that the attachment of Sir Roger and other ingenious gentlemen, lovers of the mules, to Britton, arose from the profound regard he had in general to all manner of literature." It is observable, that this meeting was the first of the kind, and the undoubted parent of some of the most celebrated concerts in London. Ward, who was his contemporary, says, that at the first institution of it, his concert was performed in his own house, which is thus described. "On the ground floor was a repository for small-coal: over that was the concert room, which was very long and narrow; and had a ceiling so low, that a tall man could but just stand upright in it. The stairs to this room were on the outside of the house, and could scarce be ascended without crawling. The house itself was very old and low built, and in every respect so mean as to be a fit habitation only for a very poor man." Notwithstanding all, this mansion, despicable as it may seem, attracted to it as polite an audience as ever the opera did.

At these concerts Dr Pepusch, Mr Handel, Mr Bannister, Mr Henry Needler, and other capital masters, were performers. At the first institution of this club, it is certain, Britton would receive no gratuity whatever from his guests, and was offended whenever any was offered him. According to some, however, he departed from this; and the rules were, Britton found the instruments, the subscription was 10*s.* a year, and they had coffee at a penny a dish.

The singularity of his character, the course of his studies, and the collections he made, induced suspicions that Britton was not the man he seemed to be. Among other groundless conjectures, his musical assembly was thought by some to be only a cover for seditious meetings; by others, for magical purposes; and Britton himself was taken for an atheist, a presbyterian, a Jesuit, &c.

The circumstances of this man's death are not less remarkable than those of his life. There lived at that time one Samuel Honeyman, a blacksmith by trade, who became very famous for a faculty which he possessed of speaking as if his voice proceeded from some distant part of the house where he stood; in short, he was one of those men called *Ventriloqui**, i. e. those that speak from their bellies. One Robe, an acquaintance of Britton's, was foolish enough to introduce this man, unknown to Britton, for the sole purpose of terrifying him; and he succeeded in it. Honeyman, without moving his lips, or seeming to speak, announced, as from afar off, the death of Britton within a few hours, with an intimation that the only way to avert his doom was for him to fall on his knees immediately and say the Lord's prayer: the poor man did as he was bid, went home and took to his bed, and in a few days died, leaving his friend Mr Robe to enjoy the fruits of his mirth. This happened in September 1714. Brit-

ton left behind him a large collection of books, music, and musical instruments. Of the former Sir Hans Sloane was a considerable purchaser. His collection of music, mostly pricked by himself, and very neatly, fold for near 100*l.*

In the British Museum there is a painting of him taken from the life. A mezzotinto print was taken from this picture, for which Mr Hughes (author of the siege of Damascus, and a frequent performer at Britton's concerts) wrote the following lines.

Tho' mean thy rank, yet in thy humble cell
Did gentle peace and arts unpurchas'd dwell;
Well pleas'd, Apollo thither led his train,
And music warbled in her sweetest strain.
Cyllenius too, as fables tell, and Jove,
Came willing guests to poor Philemon's grove.
Let useless pomp behold, and blush to find
So low a station, such a lib'ral mind.

BRIVA *ISARÆ*, (anc. geog.), a town of Gallia Belgica on the river Isara or Oyle; now *Pontoyse*.

BRIVATES, (anc. geog.), a port of Gallia Celtica; now *Bressy*, in Brittany.

BRIVES-IA-GALLARD, a town of France, in lower Limosin. It stands in a fruitful plain, opposite to an island formed by the river Coreze, over which there are two handsome bridges. E. Long. 1. 45. N. Lat. 45. 15.

BRIXELLUM, (anc. geog.), a town of Gallia Cispadana; remarkable for being the place where Otho killed himself after the battle of Bedriacum: now *Bersello*, or *Bresello*, in the territory of Rhegio.

BRIXEN (the bishopric of), is seated in Tirol, in Germany, near the frontiers of Friuli and Carinthia, towards the east. The bishop has a vote and seat in the diet of the empire, and furnishes his contingent when any tax is laid on Tirol. The principal places are Brixen, Sertzingen, Breunack, and Lientz.

BRIXEN, the capital of the bishopric of the same name, and where the bishop commonly resides, is seated on the river Eisache, at some distance from the mountain Brenner. It is surrounded with mountains, where there are plenty of vineyards, which yield good red wine. It is a populous town; and the houses are well built with piazzas, and are painted on the outside. The public buildings are very handsome, and there are several spacious squares. It is much frequented, on account of the mineral waters that are near it. E. Long. 11. 50. N. Lat. 46. 35.

BRIXIA (anc. geog.), a town of the Cenomani in the Regio Transpadana: now *Brescia*, capital of the Bresciano.

BRIZA, *QUAKING-GRASS*, a genus of the digynia order, belonging to the triandria class of plants. There are five species of briza; two of which are natives of Britain, viz. the media or middle quaking-grass, and the minor or small quaking-grass. They grow in pasture grounds.

BRIZE, in husbandry, denotes ground that has lain long untilld.

BRIZE-Vents, shelters used by gardeners who have not walls on the north-side, to keep cold winds from damaging their beds of melons. They are inclosures about six or seven feet high, and an inch or more thick; made of straw, supported by stakes fixed into the ground, and props across on both inside and outside; and fastened together with willow-twigs, or iron-wire.

BROACH, *BROCHA* (from the French *broche*), denotes

Briva
||
Broach.

* See *Ventriloquism*.

Broadalbin
||
Brocade.

notes an awl or bodkin; also a large packing-needle. A spit, in some parts of England, is called a *broach*; and from this word comes to pierce or broach a barrel. In Scotland, *broach*, *broche*, or *broche*, is the name of an utensil which the Highlanders use, like the *fibula* of the Romans, to fasten their vest. They are usually made of silver; of a round figure; with a tongue crossing its diameter, to fasten the folds of the garment; sometimes with two tongues, one on each side of a cross-bar in the middle. There are preserved in several families, ancient broches of very elegant workmanship, and richly ornamented. Some of them are inscribed with names, to which particular virtues used to be attributed; others are furnished with receptacles for relics, supposed to preserve from harm. So that these broches seem to have been worn not only for use, but as amulets. One or two of this sort are figured and described by Mr Pennant, *Tour in Scotl.* i. 90. iii. 14. edit. 3^d.

BROADALBIN. See BRAIDALBIN.

BROADSIDE, in the sea-language, denotes a volley of cannon, or a general discharge of all the guns on one side of a ship at once.

BROCADE, or BROCANO, a stuff of gold, silver, or silk, raised and enriched with flowers, foliages, and other ornaments, according to the fancy of the merchants or manufacturers.

Formerly the word signified only a stuff, wove all of gold, both in the warp and in the woof, or all of silver, or of both mixed together; thence it passed to those of stuffs in which there was silk mixed, to raise and terminate the gold or silver flowers: but at present all stuffs, even those of silk alone, whether they be programs of Tours or of Naples, satins, and even taffeties or lustrings, if they be not adorned and worked with some flowers or other figures, are called *brocades*.

In manufacturing brocades, the flattened gilt wire is spun on threads of yellow silk approaching as near as may be to the colour of gold itself. The wire, winding off from a hobbin, twists about the thread as it spins round; and, by means of curious machinery, too complex to be described here, a number of threads are thus twisted at once by the turning of one wheel. The principal art consists in so regulating the motion, that the several circumvolutions of the flattened wire on each side may just touch one another, and form, as it were, one continued covering. It is said, that at Milan there is made a sort of flattened wire gilt only on one side, which is wound upon the thread so that only the gilt side appears; and that the preparation of this wire is kept a secret, and has been attempted in other places with little success. There is also a gilt copper wire, made in the same manner as the gilt silver: Savary observes, that this kind of wire, called *sauf gold*, is prepared chiefly at Nuremberg; and that the ordinances of France require it to be spun, for its distinction from the gilt silver, on flaxen or hempen threads. One of our writers takes notice, that the Chinese, instead of flattened gilt wire, use slips of gilt paper, which they both interweave in their stuffs, and twist upon silk threads: this practice he inconsiderately proposes as a hint to the British weaver. But, whatever be the pretended beauty of stuffs of this kind of manufacture, it is obvious that they must want durability. The Chinese themselves, according to Du Halde's account, sensible of this im-

perfection, scarcely use them any otherwise than in tapestries, and such other ornaments as are not intended to be much worn, or exposed to moisture.

The Venetians have carried on a large trade to the Levant, in a kind of brocade called *damaquette*, which, though it has only about half the quantity of gold or silver as that made among us, looks far more beautiful. The flattened wire is neither wound close together on the silk threads, nor the threads struck close in the weaving; yet, by passing the stuff between rolls, the disposition and management of which is kept a secret, the tissue or flower is made to appear one entire brilliant plate of gold or silver. The French ministry, ever vigilant for the advancement of arts and commerce, judged this manufacture important enough to deserve their attention; and accordingly, for contriving the machinery, they engaged the ingenious M. Vaucanson, known throughout Europe for his curious pieces of mechanism, who, in the memoirs of the academy for the year 1757, lately printed, gives an account of his success, and of the establishment of such a manufacture at Lyons.

The lower roll is made of wood, 32 inches in length and 14 in diameter; the upper one of copper, 36 inches long and 8 in diameter: this last is hollow, and open at one end, for introducing iron heaters. For making the rolls cylindrical, he has a particular kind of lathe, wherein the cutting tool, which the most dextrous hand could not guide in a straight line through such a length as 36 inches, is made to slide, by means of a screw, on two large steel rulers, perfectly straight, and capable of being moved at pleasure, nearer, and always exactly parallel, to the axis of the roll.

He first disposed the rolls nearly as in the common flattening mill. In this disposition, ten men were scarcely sufficient for turning them with force enough to duly extend the gilding; and the collars, in which the axes of the rolls turned at each end, wore or galled so fast, that the pressure continually diminished, inasmuch that a piece of stuff of ten ells had the gilding sensibly less extended on the last part than on the first. He endeavoured to obviate this inconvenience by screwing the rolls closer and closer in proportion as the stuff passed thro', or as the wearing of the collars occasioned more play between them; but this method produced an imperfection in the stuff, every turn of the screw making a sensible bar across it. To lessen the attrition, each end of the axis, instead of a collar, was made to turn between three iron cylinders called *friction-wheels*: but even this did not answer fully, for now another source of unequal pressure was discovered. The wooden roll, being compressible, had its diameter sensibly diminished: it likewise lost its roundness, so that the pressure varied in different points of its revolution. On trying different kinds both of European and Indian woods, all the hard ones split, the soft ones warped without splitting, and, of more than 20 rolls, there was not one which continued round for 24 hours even without being worked in the machine.

These failures put him upon contriving another method of pressing the rolls together, so that the force should always accommodate itself to whatever inequalities might happen. The axis of the copper roll being made to turn between friction-wheels as before, that of the wooden one is pressed upwards by a lever at each

Lewis's
Commerce of
Asia.

Brocade.

end furnished with a half collar for receiving the end of the axis. Each lever has the end of its short arm supported on the frame of the machine, and the long arm is drawn upwards by an iron rod communicating with the end of the short arm of another lever placed horizontally: to the long arm of this lever is hung a weight, and the levers are so proportioned, that a weight of 30 pounds presses the rolls together with a force equivalent to 17,536 pounds, which was found to be the proper force for the sufficient extension of the gilding. By this contrivance four men can turn the rolls with more ease than ten can turn those which are kept together by screws; and the same weight acting uniformly in every part, the pressure continues always equal, though the wooden roll should even become oval, and though the stuff be of unequal thickness.

A piece of cloth, of about two ells, is sewed to the beginning and end of the stuff, to keep it out to its width when it enters and parts from the rolls, which could not be done by the hands for fear of burning or bruising them: as it would take too much time to sew these cloths to every small piece of an ell or two, a number of these is sewed together. The stuff is rolled upon a cylinder, which is placed behind the machine, and its axis pressed down by springs to keep the stuff tight as it comes off. Four iron bars, made red hot, are introduced into the copper roll, which in half an hour acquires the proper degree of heat, or nearly such a one as is used for the ironing of linen: the wooden roll is then laid in its place, and the machine set to work. If more than 30 ells are to be passed at once, the wooden roll must be changed for another, for it will not bear a long continuance of the heat without danger of splitting; and therefore the manufacturer should be provided with several of these rolls, that when one is removed, another may be ready to supply its room: as soon as taken off from the machine, it should be wrapt in a cloth and laid in a moist place.

The principal inconvenience attending the use of this machine, is, that the heat necessary for extending the gilding, though it improves the brightness of white and yellow silks, is injurious to some colours, as crimson and green. A double pressure will not supply the place of heat; and the only method of preventing this injury, or rendering it as slight as possible, appeared to be, to pass the stuff through with great celerity.

Method of Cleaning Brocade when sullied. For this purpose neither alkalies nor soap must be used; because the former, while they clean the gold, corrode the silk, and change or discharge its colour; and the latter also alters the shade, and even the species, of certain colours. But spirit of wine may be used without any danger of its injuring either the colour or quality of the subject; and in many cases proves as effectual for restoring the lustre of the gold, as the most corrosive detergents. A rich brocade, flowered with a variety of colours, after being disagreeably tarnished, had the lustre of the gold perfectly restored by washing it with a soft brush dipped in warm spirit of wine, and some of the colours of the silk which were likewise soiled became at the same time remarkably bright and lively. Spirit of wine seems to be the only material adapted to this intention, and probably the boasted secret of certain artists is no other than

Commerce of this spirit disguised. Dr Lewis says he does not know
Arts, p. 39. of any other that is of sufficient activity to discharge

the foul matter, without being hurtful to the silk. As to powders, however fine, and however cautiously used, they scratch and wear the gold, which here is only superficial, and of extreme tenacity.

BROCADE-Shell, the English name of a species of *LIMAX*.

BROCATTEL, or *BROCADEL*, a kind of coarse brocade; chiefly used for tapestry.

BROCCOLI, a kind of cabbage cultivated for the use of the table. See *BRASSICA*.

BROCHE, or *BROACH*. See *BROACH*.

BROCK, among sportsmen, a term used to denote a badger.—A hart, too, of the third year, is called a *brock*, or *brocket*; and a hind of the same year is called a *brocket's fister*.

BROD, a town of Hungary, in the county of Possega in Slavonia, seated on the river Save. It was once more considerable than at present; and is memorable for a victory obtained over the Turks in 1668. E. Long. 18. 36. N. Lat. 45. 20.

BRODEAU (John), in Latin *Brodeus*, a great critic, on whom Lyppius, Scaliger, Grotius, and all the learned, have bestowed great encomiums, was descended from a noble family in France, and born at Tours in 1500. He was liberally educated, and placed under Alciat to study the civil law; but soon forsaking that, he gave himself up wholly to languages and the belles lettres. He travelled into Italy, where he became acquainted with Sadoleto, Bembo, and other famous wits; and here (says Thuanus) he applied himself to the study of mathematics, philosophy, and the sacred languages, in which he made no small proficiency. Then, returning to his own country, he led a retired, but not an idle, life, as his many learned lucubrations abundantly testify. He was a man free from all ambition and vain glory, and suffered his works to be published rather under the sanction and authority of others than under his own. His chief works are, 1. A commentary on the *Anthologia*. 2. Ten books of miscellanies. 3. Notes on Oppian, Euripides, &c. He died in 1563, aged 63.

BRODERA, or *BRODRA*, a town of Asia, in the empire of the Great Mogul. It stands in a large sandy plain, on the little river Wasseet; and is fortified, after the old way, with pretty good walls and towers. It is inhabited by Banians and calico-weavers. The country about it produces plenty of gum-lac and indigo. E. Long. 72. 30. N. Lat. 22. 10.

BROGLING FOR *RELS*; the same with *SNIGGLING*.

BROGLIO, a town of Piedmont in Italy, and capital of a county of the same name, situated near the frontiers of Provence, in E. Long. 6. 42. N. Lat. 44. 12.

BROKE (Sir Robert), lord chief justice of the common pleas, was the son of Thomas Broke, Esq; of Claverley in Shropshire, and educated at Oxford; from whence he removed to the Middle Temple, and soon became a very eminent lawyer. In the year 1542, he was chosen summer reader, and double reader in 1550. In 1552, he was made serjeant at law; and the year following (first of queen Mary), lord chief justice of the common pleas; about which time he received the honour of knighthood. Stow says he was recorder of London and speaker of the house of commons; which is confirmed by a manuscript in the Ashmolean library. He died and was buried at Claverley in Shropshire, the place

Brocade
 Broke.

Broker,
Broker.

place of his nativity, in 1558. Wood gives him the character of a great lawyer and an upright judge. His works are, 1. An abridgement containing an abstract of the year-books till the time of queen Mary. 2. Certain cases adjudged in the reign of Henry VIII. Edward VI. and queen Mary. 3. Reading on the statute of limitations, 32 Hen. VIII. c. 2.

BROKEN WIND, among farriers. See *FARRIERY*, § 7.

BROKER, a name given to persons of several and very different professions; the chief of which are exchange-brokers, stock-brokers, pawn-brokers, and brokers simply so called who sell household-furniture and second-hand apparel.

Exchange-BROKERS, are a kind of agents, or negotiators, who contrive, propose, and conclude bargains between merchants, and between merchants and tradesmen, in matters of bills of exchange, or merchandise, for which they have to much commission. These, by the statute of 8 and 9 William III. are to be licenced in London by the lord mayor, who gives them an oath, and takes bond for the faithful execution of their offices. If any person shall act as broker without being thus licenced and admitted, he shall forfeit the sum of 500l.; and persons employing him, 5l.; and brokers are to register contracts, &c. under the like penalty: also brokers shall not deal for themselves, on pain of forfeiting 200l. They are to carry about with them a silver medal, having the king's arms and the arms of the city, and pay 40s. a-year to the chamber of the city.—The exchange-brokers make it their business to know the alteration of the course of exchange, to inform merchants how it goes, and to give notice to those who have money to receive or pay beyond sea: they are the proper persons for negotiating the exchange; and when the matter is accomplished, that is, when the money for the bill is paid, and the bill delivered, they have for brokerage 2s. for 100l. sterling.

They reckon at Paris, among the city-officers, who are employed under the jurisdiction of the provost of the merchants, and *schewins* or aldermen, three sorts of brokers. 1. The brokers of horses for the carriage of merchandise by water: they are established for the navigation; and take care to examine the horses used to draw the boats up the river, to set the horses together, to oblige the carriers to repair their boats, or to break such as are no longer fit to serve. 2. Sworn wine-brokers on the keys, to examine and taste all the wine that arrives there. 3. Brokers of bacon and lard. These are established to examine those sorts of merchandises as they are landed or unloaded, and to answer for their goodness to the buyer, and to the seller for the price of his wares.

Stock-BROKERS, are those who are employed to buy and sell shares in the joint stock of a company or corporation. As the practice of stock-jobbing has been carried to such an excess as became not only ruinous to a great number of private families, but even affected, or at least might soon affect, the public credit of the nation, the legislature thought fit to put a stop to it, or at least to bring it within certain bounds, and under some regulation, by statute 7 George II. c. viii. sect. 1.

Pawn-BROKERS, persons who keep shops, and lend money upon pledges to necessitous persons, and most commonly at an exorbitant interest. They are more properly styled *pawn-takers*, or *tally-men*, sometimes

friseurs, or *friseriers*. These are meant in 1 Jac. I. cap. xxi. sect. 5. where it is declared, that the sale of goods wrongfully taken to any broker, or pawn-broker, in London, Westminster, Southwark, or within two miles of London, does not alter the property. And (sect. 7.) if a broker, having received such goods, shall not, upon request of the owner, discover them, how and when he came by them, and to whom they are conveyed, he shall forfeit the double value thereof, to be recovered by action of debt, &c.

In the cities of Italy, there are companies established by authority for the letting out money on pawns, called *mounts of piety*; a title little becoming such institutions. In some parts of Italy, they have also mounts of piety of another kind, wherein they only receive ready money, and return it again with interest, at a certain sum *per annum*. At Bologna, they have several such mounts, which are distinguished into *frank* and *perpetual*: the interest of the former is only four per cent.; that of the latter, seven.

BROKERS are also those who sell old household furniture, and wearing apparel, &c.

BROME (Alexander), a poet and attorney in the lord mayor's court in the reign of Charles II. was the author of the greatest part of those songs and epigrams which were published in favour of the royalists, and against the *rump*, as well in Oliver Cromwell's time as during the rebellion. These, together with his Epistles and Epigrams translated from different authors, were all printed in one volume 8^{vo} after the Restoration. He also published a version of Horace, by himself and others, which is very far from being a bad one. He left behind him a comedy entitled *The Cunning Lovers*: and the world is indebted to him for two volumes of Richard Brome's plays in octavo; many of which, but for his care in preserving and publishing them, would in all probability have been entirely lost. He died in 1666.

BROME (Richard), a dramatic writer who lived in the reign of king Charles I. and was cotemporary with Decker, Ford, Shirley, &c. His extraction was mean, he having been originally no better than a menial servant to the celebrated Ben Johnson. He wrote himself, however, into high reputation, as is testified not only by various commendatory verses written by his cotemporaries and prefixed to many of his plays, but also by some lines which his quondam master addressed to him on account of his comedy called *The Northern Laps*. Brome, in imitation of his master, laid it down as his first great point, to apply closely to the study of men and manners. His genius was entirely turned to comedy; and therefore his proper province was observation more than reading. His plots are all his own, and are far from being ill conducted; and his characters, which for the most part are strongly marked, were the offspring of his own judgment and experience, and his close attention to the foibles of the human heart. In a word, his plays in general are good ones; met with great applause when first acted; and, as Langbain informs us, were thought by the players worthy to be revived, to their own profit and the author's honour, in that critical age which he himself lived in. Nay, we have had a proof, even in our own time, of the merit of one of his comedies, which with a very little alteration has lately been revived, and with great success, viz. *The Jovial*

Broker,
Brome.

cial Grew, which for no less than three seasons running brought crowded audiences to the theatre-royal in Covent Garden at all the frequent repetitions of its performance. The comedies which the author left behind him are 15 in number; ten of which are collected together, as above mentioned, in two volumes octavo. He joined also with Thomas Heywood in a play called *The Lancashire Witches*.

BROMELIA, the **PINE-APPLE**; a genus of the monogynia order, belonging to the hexandria class of plants.

Species. Of this genus Linnæus enumerates seven species; but the following are the most remarkable. I. The ananas; of which there are six varieties, viz. 1. The ovatus, or oval-shaped pine-apple. 2. The pyramidalis, pyramidal, or sugar-loaf pine. 3. The glaber, with smooth leaves. 4. The lucidus, with shining green leaves. 5. The ferrotinus, with a yellowish-coloured flesh. 6. The viridis, or green pine-apple. The other species are, II. The nudicaulis, with the lower leaves indented and prickly. III. The lingulata, with obtuse, fawed, and prickly leaves.—The first sort hath leaves very like some sorts of aloes, but not so thick and succulent, which are strongly armed with black spines. From the centre of the plant arises the flower-stalk, which is near three feet high, the lower part of which is garnished with entire leaves placed alternately at every joint. The upper part of the stalk is garnished with flowers set in a loose spike or thyrse quite round: these are succeeded by oval seed-vessels, having a longitudinal partition, in the centre of which are fastened smooth cylindrical seeds.—The second hath shorter leaves than the first, which are sharply fawed on their edges, and of a deep green colour. The flower-stem arises from the centre of the plant, which divides upward into several branches: the upper part of these are garnished with spikes of flowers, which come out alternately from the sides of the branches, each having a narrow entire leaf just below it, which are longer than the spike. The flowers are placed very close on the spikes; and when they decay, the empalement turns to an oval pointed seed-vessel, inclosing seeds of the same shape with the other.

Culture, &c. The first sort of ananas is the most common in Europe; but the second sort is much preferable to it, the fruit of this being larger and much better flavoured: the juice of this sort is not so astringent as that of the first; so that this fruit may be eaten in greater quantity, with less danger. This sort frequently produces suckers immediately under the fruit, whereby it may be increased much faster than the common sort; so that in a few years it may be the best common sort in Britain.

The third sort is preferred by some curious persons for the sake of variety; but the fruit is not worth any thing.

The sort with very smooth grass-green leaves was raised from seeds taken out of a rotten fruit which came from the West Indies to the late Henry Heathcote, Esq; from whom Mr Miller received one plant, which produced large fruit: this is what the people of America call the *king pine*.

The plants are propagated by planting the crowns which grow on the fruit, or the suckers which are produced either from the sides of the plants or under the

fruit: both which are found to be equally good; although by some persons the crown is thought preferable to the suckers, as supposing it will produce fruit sooner than the suckers, which is certainly a mistake. The suckers and crowns must be laid to dry in a warm place for four or five days, or more (according to the moisture of the part which adhered to the old plant or fruit); for if they are immediately planted, they will rot. The certain rule of judging when they are fit to plant, is by observing if the bottom is healed over and become hard; for if the suckers are drawn off carefully from the old plants, they will have a hard skin over the lower part, so need not lie so long as the crowns or those whose bottoms are moist. But whenever a crown is taken from the fruit, or the suckers from old plants, they should be immediately divested of their bottom-leaves, so high as to allow depth for their planting; so that they may be thoroughly dry and healed in every part, left when they receive heat and moisture they should perish, which often happens when this method is not observed. If these suckers or crowns are taken off late in the autumn, or during the winter, or early in the spring, they should be laid in a dry place in the stove for a fortnight or three weeks before they are planted; but in the summer season, they will be fit for planting in a week at farthest.

These should be planted in a rich good kitchen-garden mould, not too heavy so as to detain the moisture too long, nor over light and sandy; but where this is wanting, you should procure some fresh earth from a good pasture, which should be mixed with about a third part of rotten neat's dung, or the dung of an old melon or cucumber bed which is well consumed. These should be mixed six or eight months at least before they are used, but if it be a year it will be the better; and should be often turned, that their parts may be the better united, as also the clods well broken. This earth should not be screened very fine; for if you only clear it of the great stones, it will be better for the plants than when it is made too fine. You should always avoid mixing any sand with the earth, unless it be extremely stiff, and then it will be necessary to have it mixed at least six months or a year before it is used; and it must be frequently turned, that the sand may be incorporated in the earth so as to divide its parts: but you should not put more than a sixth part of sand; for too much sand is very injurious to these plants. In the summer season, these plants must be frequently watered; but you should not give them large quantities at a time: you must also be very careful that the moisture is not detained in the pots by the holes being stopped, for that will soon destroy the plants. If the season is warm, they should be watered twice a-week; but in a cool season, once a-week will be often enough: and, during the summer season, you should once a-week water them gently all over their leaves; which will wash the filth from off them, and thereby greatly promote the growth of the plants.

There are some persons who frequently shift these plants from pot to pot. But this is by no means to be practised by those who propose to have large well-flavoured fruit: for, unless the pots be filled with the roots, by the time the plants begin to show their fruit, they commonly produce small fruit, which have generally large crowns on them; therefore the plants will

not

Bromelia. not require to be new-potted oftener than twice in a season. The first time should be about the end of April, when the suckers and crowns of the former year's fruit (which remained all the winter in those pots in which they were first planted) should be shifted into larger pots; *i. e.* those which were in halfpenny or three-farthing pots should be put into penny or at most three-halfpenny pots, according to the size of the plants; for you must be very careful not to overpot them, nothing being more prejudicial to these plants. The second time for shifting of them is in the beginning of August; when you should shift those which are of a proper size for fruiting the following spring into two-penny pots, which are full large enough for any of these plants. At each of these times of shifting the plants, the bark-bed should be stirred up, and some new bark added, to raise the bed up to the height it was at first made; and when the pots are plunged again into the bark-bed, the plants should be watered gently all over their leaves, to wash off the filth, and to settle the earth to the roots of the plants. If the bark-bed be well stirred, and a quantity of good fresh bark added to the bed, at this latter shifting it will be of great service to the plants; for they may remain in the same tan until the beginning of November, or sometimes later, according to the mildness of the season, and will require but little fire before that time. During the winter, they will not require to be watered oftener than once a-week, according as you find the earth in the pots to dry: nor should you give them too much at each time; for it is much better to give them a little water often, than to over-water them.

You must observe never to shift those plants which show their fruit into other pots; for if they are removed after the fruit appears, it will stop the growth, and thereby cause the fruit to be smaller, and retard its ripening, so that many times it will be October or November before the fruit is ripe: therefore you should be very careful to keep the plants in a vigorous growing state from the first appearance of the fruit, because upon this depends the goodness and the size of the fruit; for if they receive a check after this, the fruit is generally small and ill-tasted.

When you have cut off the fruit from the plant whose kind you are desirous to propagate, you should trim the leaves, and plunge the pots again into a moderate hot-bed, observing to refresh them frequently with water, which will cause them to put out suckers in plenty; so that a person may be soon supplied with plants enough of any of the kinds, who will but observe to keep the plants in health.

The most dangerous thing that can happen to these plants is their being attacked by small white insects, which appear at first like a white mildew, but soon after have the appearance of lice: these attack both root and leaves at the same time; and, if they are not soon destroyed, will spread over a whole stove in a short time, and in a few weeks entirely stop the growth of the plants by sucking out the nutritious juice, so that the leaves will appear yellow and sickly, and have generally a great number of yellow transparent spots all over them. These insects, after they are fully grown, appear like bugs, adhering so closely to the leaves as not to be easily washed off, and seem to have no local motion. They were originally brought from America

upon the plants which were imported from thence; and are probably the same insects which have destroyed the sugar-canes of late in some of the Leeward Islands, for upon some sugar-canes which were sent Mr Miller from Barbadoes he observed great numbers of these insects. Since they have been in England, they have spread greatly in such stoves where there has not been more than ordinary care taken to destroy them. They have also attacked the orange-trees in many gardens near London, and have done them incredible damage; but they do not endure the cold of our climate in winter, so that they are never found on such plants as live in the open air. The only method yet discovered for destroying these insects, is by frequently washing the leaves, branches, and stems, of such plants as they attack, with water in which there has been a strong infusion of tobacco stalks. But this method cannot be practised on the ananas plants, because the insects will fasten themselves so low between the leaves, that it is impossible to come at them with a sponge to wash them off; so that if all those which appear to fight are cleared off, they will soon be succeeded by a fresh supply from below, and the roots will be also equally infested at the same time. Therefore, wherever these insects appear on the plants, the safest method will be to take the plants out of the pots, and clear the earth from the roots; then prepare a large tub, which should be filled with water in which there has been a strong infusion of tobacco stalks; into this tub you should put the plants, placing some sticks across the tub to keep them immersed in water. In this water they should remain 24 hours; then take them out, and with a sponge wash off all the insects from the leaves and roots, and dip the plants into a tub of fair water, washing them therein, which is the most effectual way to clear them from the insects. After which, you should pot them in fresh earth; and, having stirred up the bark-bed, and added some new tan to give a fresh heat to the bed, the pots should be plunged again, observing to water them all over the leaves, and this should be repeated once a-week during the summer season; for these insects always multiply much faster where the plants are kept dry, than where they are sometimes sprinkled over with water, and kept in a growing state.

As these insects are frequently brought over from America on the ananas plants which come from thence, those persons who procure their plants from thence, should look carefully over them when they receive them, to see they have none of these insects on them; for if they have, they will soon be propagated over all the plants in the stove where they are placed; therefore, whenever they are observed, the plants should be soaked (as before directed) before they are planted into pots.

The other species of bromelia are likewise natives of warm countries, but require no particular directions for their culture farther than what is common to other exotics.

BROMLEY, a town of Kent in England, situated on the river Ravensburn, in E. Long. O. 5. N. Lat. 51. 23.

BROMSGROVE, a town of Worcestershire in England, seated on the river Salwarp. It is a pretty good town, well inhabited by clothiers; and the market is large for corn, cattle, and all sorts of provisions. W. Long.

Bromelia
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Bromf-
grove.

Bromoides
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Bronze.

Long. 2. 5. N. Lat. 52. 26.

BROMOIDES, in botany. See *FESTUCA*.

BROMUS, BROOM-GRASS; a genus of the digynia order, belonging to the triandria class of plants. There are 17 species, eight of which are natives of Britain, viz. the fecalinus or field broom-grass; the arvensis, or common broom-grass; the ciliatus, or wall broom-grass; the ilexilis, or barren broom-grass; the giganteus, or tall broom-grass; the ramifolius, or wood broom-grass; and the pinnatus, or spiked broom-grass.

BROMYARD, a town of Hertfordshire in England, seated on a rising ground, and containing about 200 houses. W. Long. 2. 46. N. Lat. 52. 20.

BRON, a town of Italy, in the duchy of Milan, where the Imperialists gained an advantage over the French in 1703. E. Long. 10. 0. N. Lat. 44. 50.

BRONCHIA, in anatomy, the ramifications of the trachea. See *ANATOMY*, n° 380.

BRONCHOCELE, a tumour rising in the anterior part of the neck *.

BRONCHOTOMY, in surgery, an incision made in the aspera arteria, or wind-pipe, which is necessary in many cases, and especially in a violent quinsy, to prevent suffocation from the great inflammation or tumor of the parts. It is also called *laryngotomy* and *tracheotomy*. See *SURGERY*, n° 33.

BRONTIÆ, or THUNDER-STONES, in natural history. See *BELEMNITES*.

BRONTIUM, in Grecian antiquity, a place underneath the floor of the theatres, in which were kept brazen vessels full of stones and other materials, with which they imitated the noise of thunder.

BRONTOLOGY, denotes the doctrine of thunder, or an explanation of its causes, phenomena, &c. together with the prefaces drawn from it †.

BRONZE, a compound of copper and tin, to which sometimes other metallic substances, particularly zinc, are added.—This metal is brittle, hard, and sonorous. It is employed for various uses, as for making of bells, cannons, and statues; and the proportions of the component metals are varied to suit the several purposes to which it is applied. This compound, like some others, is specifically heavier than either of the metals taken separately *. A metallic mass, composed of four fifths of copper and one fifth part of tin, weighs in water $7\frac{7}{10}$ grains more than the same quantities of these two metals would together weigh in water if not alloyed. This proves, that in the union of copper and tin there is a penetration of parts, the one metal entering into the pores of the other; and this is further confirmed by an observation of Mr Tillet, member of the royal academy of Sciences. In his memoir concerning the ductility of metals, he takes notice, that when the mixture of copper and tin is made in the proportions above-mentioned, the colour of the copper is entirely annulled and covered by that of the tin, although the quantity of the first be four times greater; and this singular effect cannot be understood without admitting a total change in the size and disposition of the pores of the compound metal.

Tin being less subject to rust than copper, bronze is also found to be less liable to be covered with verdigrise than pure copper is; and this is one reason why it is used for cannons, statues, and works exposed to the air and weather. The greater fusibility of bronze

Bronze
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Broom.

than copper is also an advantageous property, and much facilitates the casting of large works. The operation for casting bronze is sufficiently simple. For this purpose a brick furnace is used, nearly of the shape of an oven for baking bread. The floor of this furnace is concave, and consists of a composition of sand and clay. In this hollow floor the metals to be fused are put.—The furnace has three openings. The first is a lateral mouth, at which enters the flame of the wood placed in a second furnace, on one side of the first: the second opening is a chimney placed on a side opposite to the mouth, by means of which the flame is drawn over the metal. The third is a hole which is opened and shut at pleasure; through which the inner part of the furnace may be occasionally inspected, that the state of the metal may be observed. When the metal is in the state required, a fourth opening is then unclosed, communicating with the hollow floor, and thro' which the melted metal flows by channels into the moulds prepared to receive it.

BRONZE, also denotes a colour prepared by the colourmen of Paris, wherewith to imitate bronze.—There are two sorts, the red bronze, and the yellow or golden. The latter is made solely of copper-dust, the finest and brightest that can be got: the former is made of the same, with the addition of a little quantity of red oker well pulverized. They are both applied with varnish. To prevent their turning greenish, the work must be dried over a chafing-dish as soon as bronzed.

BRONZES, a name given by antiquarians to figures either of men or beasts, to urns, and, in general, to every piece of sculpture which the ancients made of that metal. We likewise give the name of *bronzes* to statues or busts cast of bronze, whether these pieces be copies of antiques, or original subjects.—Among medallists, all copper medals bear the name of *bronzes*.

BRONZING, the art or act of imitating bronze, which is done by means of copper dust or leaf, fastened on the outside, as gold leaves are in gilding.

BROOD, the young of fish, fowls, &c.

BROODING, the act of a hen in hatching her eggs. See *HATCHING*.

BROOK, a little river or small current of water.—A brook is distinguished from a river, inasmuch as a river flows at all times, whereas a brook flows at some particular seasons only.

BROOK-Lime. See *VERONICA*.

BROOM, in botany. See *GENISTA*.

Butcher's-BROOM, in botany. See *RUSCUS*.

Spanish BROOM, in botany. See *SPARTIUM*.

Broom-Flower, (*ordre de la geniste*), an order instituted by St Louis, king of France, to shew the esteem which he had for the queen his wife, he himself receiving this order the evening before his queen's coronation.

Broom-Gall, in natural history; a name given by authors to a remarkable species of galls found on the *genista vulgaris*, or common broom. This is occasioned, like all other galls, by the puncture and eating of an insect: and, when opened, is found to contain a small oblong worm of a red colour, but whose size requires the use of a glass to see it distinctly. This gall is of a very singular kind: it is round and prickly; the stalk of the broom always grows directly through it, as if thrust through its middle; and, when nicely examined, the

* See (the Index sub-joined to) Medicine.

† See Electricity, and Thunder.

* See Chemistry, n° 379.

Broom
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Brother.

Brother
||
Brother.

the whole gall appears to be formed of a congeries of leaves much larger than those of the broom naturally are, and twisted into a sort of horns or cornets, ending in a point: these leaves are all hollowed in the middle; and are so thick set and nicely fixed to one another, that they make up the substance of the gall, which is nevertheless a considerably hard one, and their points make the appearance of spines or prickles on the outside. Sometimes there is a sort of fleshy or pulpy substance within it, which supports the leaves; and the worms are sometimes found in this, sometimes in the hollows of the leaves, and sometimes between them: they are so numerous, that there are often some hundreds of them in one gall. The origin of this gall is not from the eggs of the parent animal lodged in the tree; but they are deposited on the surface of the branches, and the young worms, while very small, almost as soon as hatched from them, go in company to some bud on the side of the branch: they get into the folds of this bud, and wounding it in several parts, cause a wrong derivation of the juices into it; the consequence of which is, that instead of forming a branch shooting out from the other, it only yields a congeries of leaves which every where surround it. These galls are of various sizes, the largest seldom exceeding that of a nut; and there are often three or four of them seen on one branch, placed at an inch, or a little more, distance from one another.

BROOM-Rape, in botany. See OROBANCHE.

BROOMING, or BREAMEING, of a Ship, the washing and burning off all the filth the has contracted on her sides with weeds, straw, broom, or the like, when she is on the careen, or on the ground. See CAREENING.

BROSSARD (Sebastien de), an eminent French musician. In the former part of his life he had been prebendary and chapel-master of the cathedral church of Strasburg; but afterwards became grand-chaplain, and also maitre de chapelle in the cathedral of Meaux. There is extant of his a work intitled *Prodromus musicalis*. He was author also of a very useful book entitled *Dictionnaire de musique*, printed at Amsterdam, in folio, 1703, and afterwards at the same place in octavo, without a date. At the end of this book is a catalogue of authors ancient and modern, to the amount of 900, who have written on music; divided into classes, wherein are interperled many curious observations of the author relating to the history of music. By Mr Boivin's *Catalogue general des livres de musique* for the year 1729, it appears that Brossard was the author of two sets of motets, as also of nine *Lecons de Tenebres* therein mentioned. It seems that these several publications were at a time when the author was far advanced in years; for Walther takes notice, that in the *Mercurie Galante*, he is mentioned as an abbé and composer, so early as the year 1678.

BROTHEL-HOUSES, lewd places, being the common habitations of prostitutes. King Henry VIII. by proclamation, in the 37th year of his reign, suppressed all the stews or brothel-houses which had long continued on the bank-side in Southwark, contrary to the law of God and of the land*. A brothelman was a loose idle fellow; and a *feme bordelier*, or *brothelie*, a common whore. And *brothelman* is a contraction for *brothelman*†.

BROTHER, a term of relation between male children, sprung from the same parents, or from the same

father, or the same mother.

The ancients used the term *brother*, indifferently, to almost all who stood related in the collateral line; as uncles and nephews, cousins-german, &c.

According to the law of Moses, the brother of a man, who died without children, was obliged to marry the widow of the deceased, in order to raise up children to him, that his name and memory might not be extinct. See WIDOW.

Among us, it is customary for kings to give the title *brother* to each other.

In the civil law, brothers, *fratres*, in the plural number, sometimes comprehends sisters.

BROTHER is also a customary term for priests of the same persuasion to address one another by: but it is more particularly used to denote the relation between monks of the same convent; as, brother Zachary: in English, we more usually say, Friar Zachary, from the French word *frere*, brother.—Preachers also call their hearers, *my brethren*, or *my dear brethren*. This appellation is borrowed from the primitive Christians, who all called each other *brothers*. But it is now principally used for such of the religious as are not priests; those in orders are generally honoured with the title of *father*, whereas the rest are only simply brothers.

BROUAGE, a maritime town of Saintonge in France. It consists of five or six streets which terminate in a great square. It is famous for its salt-works, which are the finest in the kingdom. W. Long. 1. 0. N. Lat. 45. 50.

BROURSHAVEN, a port-town of the United Provinces, in the island of Schonen in Zealand, seated on the north side of the island, in a bay of the sea, in E. Long. 3. 35. N. Lat. 51. 50.

BROUGH, a town of Westmoreland in England, seated under Stanmore-hill, in E. Long. 17. 50. N. Lat. 54. 40. It was formerly a place of great note, being a Roman fortress; but is now so much decayed, that it is little better than a village.

BROUNCKER, or BROUNKER, (William), lord viscount of Castle-Lyons, in Ireland, and the first president of the Royal Society, was the son of Sir William Brounker, knt. and born about the year 1620. He was distinguished by his knowledge of the mathematics, and by the considerable posts of honour and profit he enjoyed after the restoration; for he had at the same time the office of chancellor to the queen, and the keeping of her great seal, that of one of the commissioners of the navy, and master of St Catherine's hospital near the Tower of London. He wrote, 1. Experiments of the recoiling of guns. 2. An algebraical paper upon the squaring of the hyperbola; and several letters to Dr Usher, archbishop of Armagh. He died in 1684.

BROUWER (Adrian), a famous Dutch painter, born either at Oudenard or Haerlem, in 1608, of poor parentage. He became the disciple of Francis Hals, under whom he proved an inimitable artist. His subjects were taken from low life, always copied from nature; as droll conversations, drunken brawls, bores at cards, or surgeons dressing the wounded. Brouwer was apprehended at Antwerp as a spy; where being discovered by Rubens, he procured his liberty, took him home, clothed him, and endeavoured to acquaint the public with his merit: but the levity of his temper made him quit his benefactor; and he died not

* 3 Inst 205.

† See Bawdry-house.

Brow
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Brown.

long after, in 1640, destroyed by a dissolute course of life.

BROW, or EYE-BROW, an hairy arch extended over the orbit of each eye. See ANATOMY, n° 398, d.

BROW-POST, among builders, denotes a beam which goes across a building.

BROW-Antler, among sportsmen, that branch of a deer's horn next the tail.

BROWALLIA, in botany, a genus of the angiospermia order, belonging to the didynamia class of plants, for which there is no English name.—Of this there are two species. The demissa, with a single flower upon each footstalk; and the elata, with one or many flowers on each footstalk. The seeds of the first were sent to Mr Miller from Panama. It usually grows about two feet high, and spreads out into lateral branches on every side of the stalk, garnished with oval leaves which are entire, and have short footstalks. Towards the end of the branches, the flowers are produced singly upon pretty long footstalks arising from the wing of the leaf. There are of a light blue colour, sometimes inclining to a purple or red; and there are often three colours of flowers on the same plant. The plant flowers in July, August, and September; and the seeds are ripe in five or six weeks after. The second sort is a native of Peru: the stalk of this plant is twice the size of that of the first, and appears somewhat shrubby; the leaves upon the flower-branches are smooth: the footstalks have some with one flower, others with three, and others with five; which are of a deep violet colour. As both species of browallia are annual plants, they must be raised from seeds, which are to be sown on a hot-bed: but they may be transplanted in June, into the borders of the flower-garden; where, if the weather proves warm, they will flower and perfect seeds; but lest these should fail, there should be a plant or two kept in the stove to secure seeds.

BROWN (Robert), a schismatic divine, the founder of the Brownists, a numerous sect of dissenters in the reign of queen Elizabeth. He was the son of Mr Anthony Brown of Tolthorp in Rutlandshire; whose father obtained the singular privilege of wearing his cap in the king's presence, by a charter of Henry VIII. Robert was educated at Cambridge, in Corpus Christi, or, according to Collier, in Bennet college, and was afterwards a schoolmaster in Southwark. About the year 1580, he began to promulgate his principles of dissension from the established church; and the following year preached at Norwich, where he soon accumulated a numerous congregation. He was violent in his abuse of the church of England; pretended to divine inspiration; and, like all other fains, pretended that he alone was the sure guide to heaven. This new sect daily increasing, Dr Freaque bishop of Norwich, with other ecclesiastical commissioners, called our apostle before them. He was insolent to the court, and they committed him to the custody of the sheriff's officer: but he was released at the intercession of lord treasurer Burleigh, to whom it seems he was related. Brown now left the kingdom; and, with permission of the States, settled at Middleburg in Zealand; where he formed a church after his own plan, and preached without molestation; but here persecution, the *sine qua non* of fanaticism, was wanting. In 1585

we find him again in England: for in that year he was cited to appear before archbishop Whitgift; and seeming to comply with the established church, was, by lord Burleigh, sent home to his father: but, relapsing into his former obstinacy, his aged parent was obliged to turn him out of his house. He now wandered about for some time, and in the course of his mission endured great hardships. At last he fixed at Northampton; where, labouring with too much indifferetion to increase his sect, he was cited by the bishop of Peterborough, and, refusing to appear, was finally excommunicated for contempt. The solemnity of this censure, we are told, immediately effected his reformation. He moved for absolution, which he obtained, and from that time became a dutiful member of the church of England. This happened about the year 1590; and, in a short time after, Brown was preferred to a rectory in Northamptonshire, where he kept a curate to do his duty, and where he might probably have died in peace: but having some dispute with the constable of his parish, he proceeded to blows; and was afterwards so insolent to the justice, that he committed him to Northampton jail, where he died in 1630, aged 80. Thus ended the life of the famous Richard Brown; the greatest part of which was a series of opposition and persecution. He boasted on his death-bed, that he had been confined in no less than 32 different prisons. He wrote "A treatise of reformation without tarrying for any, and of the wickedness of those teachers which will not reform themselves and their charge, because they will tarry till the magistrate command and compel them, by me Robert Brown;" and two others, making together a thin quarto; published at Middleburg, 1582.

BROWN (Ulysses Maximilian), a celebrated general of the 18th century, was son of Ulysses, baron Brown and Camus, colonel of a regiment of cuirassiers in the emperor's service, and descended from one of the most ancient and noble families in Ireland. He was born at Basil in 1705; and having finished his first studies at Limeric in Ireland, was, in 1715, sent for into Hungary, by count George Brown, his uncle, member of the aulic council of war, and colonel of a regiment of infantry. He was present at the famous battle of Belgrade, in 1717. Next year he followed his uncle into Italy, who made him continue his studies, in the Clementine college, at Rome, till the year 1721, when he was sent to Prague in order to learn the civil law. At the end of the year 1723, he became captain in his uncle's regiment; and in 1725, lieutenant-colonel: in 1730, he went into Corfica with a battalion of his regiment; and contributed greatly to the taking of Callanfara, where he received a considerable wound in his thigh. In 1732, the emperor made him chamberlain: He was raised to the rank of colonel in 1734; and distinguished himself so much in the war of Italy, especially at the battles of Parma and Guastalla, and in burning in the presence of the French army the bridge which the marshal de Noailles had caused to be thrown over the Adige, that he was made general in 1736. The following year he favoured the retreat of the army, after the unhappy battle of Banjaluca in Bosnia, by an excellent manœuvre, and saved all the baggage. His admirable conduct upon this occasion was rewarded by his obtaining a second regiment

Brown.

Brown. ment of infantry, vacant by the death of count Francis de Vallis.

At his return to Vienna, in 1739, the emperor Charles VI. raised him to the rank of general-field-marshal-lieutenant, and made him counsellor in the aulic council of war. After the death of that prince, the king of Prussia entering Silesia, count Brown, with a small body of troops, disputed the country with him inch by inch. He signalized himself on several other occasions; and, in 1743, the queen of Hungary made him a privy-counsellor, at her coronation in Bohemia. He at length passed into Bavaria, where he commanded the van-guard of the Austrian army; seized Deckendorf, with a great quantity of baggage; and obliged the French to abandon the banks of the Danube, which the Austrian army passed in full security. The same year, viz. in 1743, the queen of Hungary sent him to Worms, in quality of her plenipotentiary to the king of Britain; where he put the last hand to the treaty of alliance between the courts of Vienna, London, and Turin. In 1744, he followed prince Lobkowitz into Italy; took the city of Vercelli, on the 4th of August, in spite of the superior numbers of the enemy; entered their camp, overthrew several regiments, and took many prisoners. The following year he was recalled into Bavaria, where he took the town of Wilhofen by assault, and received a dangerous shot in the thigh. The same year he was made general of the artillery; and in January 1746, marched for Italy, at the head of a body of 18,000 men. He then drove the Spaniards out of the Milanese; and having joined the forces under prince de Lichtenstein, commanded the left wing of the Austrian army at the battle of Placentia on the 15th of June 1746, and defeated the right wing of the enemy's forces commanded by marshal de Maillebois. After this victory, he commanded in chief the army against the Genoese; seized the pafs of Bofetta or Bochetta, though defended by above 4000 men; and took the city of Genoa. Count Brown at length joined the king of Sardinia's troops; and took, in conjunction with him, Mont-Alban, and the county of Nice. On the 30th of November he passed the Var, in spite of the French troops; entered Provence; took the isles of St Margaret and St Honorat; and thought to have rendered himself master of a much greater part of Provence, when the revolution which happened in Genoa, and marshal de Belleisle's advancing with his army, obliged him to make that fine retreat which procured him the admiration and esteem of all persons skilled in war. He employed the rest of the year 1747 in defending the states of the house of Austria in Italy; and after the peace in 1748, he was sent to Nice to regulate there, in conjunction with the duke of Belleisle and the marquis de las Minas, the differences that had arisen with respect to the execution of some of the articles of the definitive treaty of Aix la Chapelle.

The empress queen, to reward these signal services, especially his glorious campaigns in Italy in 1749, made him governor of Transylvania, where he rendered himself generally admired for his probity and disinterestedness. In 1752, he obtained the government of the city of Prague, with the chief command of the troops in that kingdom; in 1753, the king of Poland, elector of Saxony, honoured him with the

collar of the order of the white eagle; and the next year he was declared field-marshal.

The king of Prussia entering Saxony in 1756, and attacking Bohemia, count Brown marched against him; and repulsed that prince at the battle of Lobowitz, on the 1st of October, though he had only 27,000 men, and the king of Prussia had at least 40,000. Seven days after this battle, he undertook the famous march into Saxony, to deliver the Saxon troops shut up between Pirna and Konigstein; an action worthy of the greatest captains, ancient or modern. He at length obliged the Prussians to retire from Bohemia; for which he was rewarded, by being made a knight of the golden fleece. Soon after, count Brown hastily assembled an army in Bohemia, to oppose the king of Prussia, who had again penetrated into that kingdom at the head of all his forces; and on the 6th of May fought the famous battle of Prague; in which, while he was employed in giving his orders for maintaining the advantages he had gained over the Prussians, he was so dangerously wounded, that he was obliged to be carried to Prague, where he died of his wounds, on the 26th of June 1757, at 52 years of age. There is reason to believe, that, had he not been wounded, he would have gained the victory, as he had broken the Prussians, and the brave count Schwerin one of their greatest generals was slain.

BROWN (Sir Thomas), an eminent physician and celebrated writer, was born at London, October 19th 1605. Having studied at Winchester college, and afterwards at Oxford, he travelled through France and Italy; and returning by the way of Holland, took his degree of doctor of physic at Leyden. In 1636, he settled at Norwich; and the year following, was incorporated as doctor of physic at Oxford. His *Religio Medici* made a great noise; and being translated into Latin, instantly spread throughout Europe, and gained him a prodigious reputation: it was then translated into almost every language in Europe. This book has been heavily censured by some, as tending to infidelity, and even atheism; while others, with much more reason, have applauded the piety, as well as the parts and learning, of the author. The reverend Mr Granger observes, that among other peculiarities in this book, he speaks of the ultimate act of love as a folly beneath a philosopher; and says, that he could be content that we might procreate, like trees, without conjunction; but, after the writing of it, he defended from his philosophic dignity, and married an agreeable woman. It was said, that his reason for marrying was, because he could discover no better method of procreation. His treatise on *Vulgar Errors* was read with equal avidity; he also published *Hydriotaphia*, or a Discourse of Sepulchral Urns lately found in Norfolk. His reputation in his profession was equal to his fame for learning in other respects; and therefore the college of physicians were pleased to take him into their number as an honorary member; and king Charles II. coming to Norwich in his progress, in 1671, was pleased to knight him, with singular marks of favour and respect. He died on his birth-day, in 1682, leaving several manuscripts behind him, which were published under the title of *The posthumous works of the learned Sir Thomas Brown, Knt. M. D.*

BROWN (Edward), the son of the former, physician
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Brown.

Brown
Brown.

to king Charles II. and president of the royal college at London. He was born in the year 1642; and studied at Cambridge, and afterwards at Merton college, Oxford. He then travelled; and at his return published a brief account of some travels in Hungary, Servia, Bulgaria, Macedonia, Thessaly, Austria, Styria, Carinthia, Carniola, Friuli, &c.: he also published an account of several travels through great part of Germany; and joined his name to those of many other eminent men, in a translation of Plutarch's lives. He was acquainted with Hebrew, was a critic in Greek, and no man of his age wrote better Latin. High-Dutch, Italian, French, &c. he spoke and wrote with as much ease as his mother-tongue. King Charles said of him, that "he was as learned as any of the college, and as well bred as any at court." He died August 27th 1708.

Brown (William), an English poet of the 17th century, was descended from a good family, and born at Tavistock in Devonshire in the year 1590. After he had passed through the grammar school, he was sent to Exeter college in the university of Oxford, in the beginning of the reign of James I. and became tutor to Robert Dormer, who was afterwards earl of Carnarvon, and killed at Newbury battle, September 20th 1643. He is styled in the public register of the university, "a man well skilled in all kinds of polite literature and useful arts;" *vir omni humana literatura et bonarum artium cognitione instructus*. After he had left the college with his pupil, he was taken into the family of William earl of Pembroke, who had a great respect for him; and he made his fortune so well, that he purchased an estate. His poetical works procured him a very great reputation. They are as follow. 1. Britannia's Pastorals. The first part was published at London, 1613, in folio; and ushered into the world with several copies of verses made by his ingenious and learned friends John Selden, Michael Drayton, Christopher Cook, &c. The second part was printed at London in 1616, and recommended by various copies of verses written by John Gleanville who afterwards became eminent in the profession of the law, and others. These two parts were reprinted in two vols 8^{vo}, 1625. 2. The shepherd's pipe, in seven eclogues; London, 1614, in 8vo. 3. An elegy on the never-enough bewailed death of prince Henry, eldest son of king James I. Mr Woodtells us, that it is probable, our author wrote several other poems which he had not seen. It is uncertain when he died.

Brown (Thomas), "of facetious memory," as he is styled by Addison, was the son of a farmer in Shropshire; and entered in Christ-church college, Oxford, where he soon distinguished himself by his uncommon attainments in literature. But the irregularities of his life not suffering him to continue long there, he, instead of returning to his father, went to London to seek his fortune: his companions, however, being more delighted with his humour, than ready to relieve his necessities, he had recourse to the usual refuge of half-starved wits, scribbling for bread; and published a great variety of poems, letters, dialogues, &c. full of humour and erudition, but often indelicate. Though a good-natured man, he had one pernicious quality, which was, rather to lose his friend than his joke.

Towards the latter end of Tom Brown's life, we

are informed by Mr Jacob, that he was in favour with the earl of Dorset, who invited him to dinner on a Christmas day, with Mr Dryden and some other gentlemen celebrated for their ingenuity, (as his lordship's custom was); when Mr Brown to his agreeable surprise found a bank note of 50*l*. under his plate, and Mr Dryden at the same time was presented with a another of 100*l*. Mr Brown died in the year 1704; and was interred in the cloyster of Westminster abbey, near the remains of Mrs Behn, with whom he was intimate in his lifetime. His works have been printed both in 8vo and 12mo, making 4 vols.

Brown, among dyers, painters, &c. a dusky colour, inclining towards reds. Of this colour there are various shades or degrees, distinguished by different appellations; for instance, Spanish-brown, a sad-brown, a tawney-brown, the London brown, a clove-brown, &c.

Spanish-brown is a dark dull red, of a horse-flesh colour. It is an earth; and is of great use among painters, being generally used as the first and priming colour that they lay upon any kind of timber-work in house-painting. That which is of the deepest colour, and freest from stones, is the best. Though this is of a dirty brown colour, yet it is much used, not to colour any garment, unless it be an old man's gown; but to shadow vermilion, or to lay upon any dark ground behind a picture, or to shadow yellow berries in the darkest places, when you want lake, &c. It is best and brightest when burnt in the fire till it be red hot; although, if you would colour any hare, horie, dog, or the like, it should not be burnt: but, for other uses, it is best when it is burnt; as for colouring wood, posts, bodies of trees, or any thing else of wood, or any dark ground of a picture.

BROWNISTS, in church-history, a religious sect, which sprung up in England towards the end of the 16th century. Their leader was one Robert Brown, born at Northampton. They separated from the established church, on account of its discipline and form of government. They equally disliked episcopacy and presbyterianism. They condemned the solemn celebration of marriages in churches; maintaining, that matrimony being a political contract, the confirmation of it ought to proceed from the civil magistrate. They rejected all forms of prayer; and held, that the Lord's prayer was not to be recited as a prayer, being given only as a model upon which to form our prayers.

BROWNIE, the name of a serviceable kind of sprite, who, according to a superstitious notion formerly prevalent in the Hebrides and Highlands of Scotland, (as well as among the country people in England, where he had the name of *Robin Goodfellow*), was wont to clean the houses, helped to churn, threshed the corn, and would belabour all that pretended to make a jest of him. He was represented as stout and blooming, had fine long flowing hair, and went about with a wand in his hand. He was the very counter part of Milton's *Lucifer Fiend*, who

Tells how the drudging goblin swet,
To earn his cream-bowl duly set,
When in one night, ere glim p.c. of morn,
His shadowy flail hath thrild'd the corn,
That ten day-lab'rs could not end;
Then lies him down the Lubber Fiend,
And, stretch'd along the chimney's length,
Basks at the fire his hairy thigh.

BROWSE,

Browe
||
Bruges.

BROWSE, the tops of the branches of trees, whereon beasts feed. This is sometimes also called *brouce* and *bruttle*; probably from the French *broust*, which signifies the same thing.

Browse more properly denotes the food which deer find in young copes, continually sprouting anew.

BRUCE (Robert), son of the earl of Carrick, being competitor with Baliol for the crown of Scotland, lost it by the arbitration of Edward I. of England, for generously refusing to hold the crown of Scotland, as depending on him, which his ancestors had left him independent. But Baliol having afterward broke his agreement with Edward, Bruce was easily persuaded by that king to side with him against Baliol, upon promise that he would settle him on the throne. Having contributed much to the breaking of Baliol's party, he demanded the accomplishment of king Edward's promise, who is said to have given him this answer: "What! have I nothing else to do, but to conquer kingdoms for you." However, he recovered his crown, defeated the English in several battles, raised the glory of the Scots, and extended their dominions to

BRUCHSAL, a town of Germany, in the palatinate of the Rhine, and bishopric of Spire, situated on the river Satz, in E. Long. 8. 30. N. Lat. 49. 15.

BRUCHUS, in zoology, a genus of insects belonging to the order of coleoptera. The feelers are filiform, and gradually increase in thickness. There are seven species, viz. the pill, has grey elytra interperfed with white spots, and a white fundament with two black spots. It is a native of North America, and destroys whole fields of pease: It is now found in several of the southern parts of Europe; where it does great injury to the corn. 2. The theobromæ, with whitish elytra interperfed with black points. It frequents the theobromæ or chocolate-trees in the East Indies. 3. The glidifite, with striated elytra of the same length with the belly, a pitch-coloured body, and green feelers. It is a native of America. 4. The bactris, with smooth elytra, a hoary body, and the hind part of the thighs oval. It frequents the palm-trees of Jamaica. 5. The granarius, has black elytra; the fore-feet are red, and the hind-feet are dentated. It frequents the seeds of plants in different parts of Europe. 6. The feminarius is black, with the base of the feelers and fore-feet testaceous. It is about the size of a louse, and a native of Europe. 7. The peticornis, with comb-shaped feelers longer than the body. It is a native of Barbary and China.

BRUGES, a city of the Austrian Netherlands, capital of the territory of Bruges, with a bishop's see. It is seated in a plain, eight miles from the sea; and has a great number of canals, made for the benefit of trade, one of which leads to Ghent, another to Ostend, another to Sluys, to Newport, to Furnes, to Ypres, and to Dunkirk, which you may reach in a day in the summer-time. All the waters about Bruges are without any current; but they may be changed in half an hour's time, by opening the sluices, and letting the water run into the sea. There are several bridges about the city, and that which was built in 1739 of free stone is very stately.

Bruges was in a very flourishing condition upwards of 200 years ago, and every nation had a consul here, for the maintenance of their rights and privileges;

Bruges,
Bruin.

but since the enlargement of Amsterdam and Antwerp, the trade is diminished, and its inhabitants are not numerous enough for so large a place. However, there are many rich merchants, and a chamber for trade. There are several fine churches; in the first rank of which is the cathedral, whose rich ornaments and trefure deserve notice. The finest square in the city is the great market, in which stand the halls, with public galleries, and a large court in the middle, and on one of its sides a high steeple supported only with four pillars. It is full of bells, with the most harmonious chimes in all the country. On the side of the great square there is a structure which serves for a public magazine to lay cloth in. It is built on a canal, and supported by pillars in such a manner, that small vessels can pass under it, to cross the city from the canal of Ostend to that of Ghent.

The square where the Wednesday's market is kept is very fine; for it contains several walks between two rows of trees, and a new guard-house in the middle. The Burg is a large square, in which is the town-house, built in the Gothic manner, and adorned with a variety of figures of the ancient counts and countesses of Flanders. In the same square there are several other public buildings. The church dedicated to the Virgin Mary is very fine, with a high steeple, which serves as a mark for the ships that come to Ostend; on the inside are two tombs of copper gilt, of an extraordinary magnificence. Besides the cathedral and two collegiate churches, there are five parish churches, fourteen chapels, and twelve convents for men and women. There are a great many alms-houses and hospitals, one of which is called the *school of Begards*, where there are about one hundred and eighty boys, some of which are brought up to learning, others to trades, according to their genius. Their habit is cloth, and half of them wear blue and half red, with a black bonnet. There is also a school for poor girls, to the number of one hundred and twenty, clothed with red or blue. In short, there is no place in the Low Countries where they take more care of widows and orphans.

It is remarkable that the knights of the golden fleece were instituted in this city in 1430, when the marriage of Philip the Good was celebrated with Elizabeth princess of Portugal. The parts about the city, which belong to it, are called *Franc of Bruges*, and contain thirty-seven villages, and enjoy perfect liberty, according to the tenour of their freedom. The fortifications of Bruges are but trifling, inasmuch that in the time of war they always yield to the strongest party. It is eight miles east of Ostend, twenty-four north-east of Ghent, and forty-six west of Antwerp. E. Long. 3. 5. N. Lat. 51. 11.

BRUGES (John of), (real name, John van Eick), a celebrated Flemish painter, and the first who discovered the method of painting in oil, flourished in the 15th century. He found in the course of his chemical experiments, (to which science he also applied himself), that, by grinding colours with linseed or nut-oil, he could form them into a solid body which would resist the water, and not need the varnish used in painting in water-colours or in fresco. He presented the first picture painted in this manner to Alphonfus I. king of Naples, who was much pleased with it.

BRUIN (John de), professor of natural philosophy and

and

See (Hil-
story of)
Scotland.

and mathematics at Utrecht, was born at Gorcum in 1620. He had uncommon skill in dissecting animals, and was a great lover of experiments. He made also observations in astronomy. He published dissertations *De vi attrice; De corporum gravitate et levitate; De cognitione Dei naturali; De lucis causa et origine*, &c. He had a dispute with Isaac Vossius, to whom he wrote a letter printed at Amsterdam in 1663; wherein he criticises Vossius's book *De natura et proprietate lucis*, and strenuously maintains the hypothesis of Descartes. He died in 1675, after he had been professor 23 years: and his funeral oration was pronounced four days after by M. Gravius.

BRUISE, in surgery, the same with CONTUSION.

BRUMALES PLANTÆ, in botany, (from *bruma* winter); plants which flower in our winter: common about the Cape.

BRUMALIA, in Roman antiquity, festivals of Bacchus celebrated twice a-year; the first on the 12th of the kalends of March, and the other on the 18th of the kalends of November. They were instituted by Romulus, who during these feasts used to entertain the senate. Among other heathen festivals which the primitive Christians were much inclined to observe, Tertullian mentions the *brumæ* or *brumalia*.

BRUMOY (Peter), a learned jesuit born at Rouen in 1668, distinguished himself in his youth by his talents for the belles lettres; and during his whole life was beloved for his probity, his virtue, and the goodness of his heart. He wrote many works, the most considerable of which is his *Theatre of the Greeks*. He died at Paris in 1742.

BRUN (Anthony le), an ambassador of Spain, famous for his skill in negotiating, was of an ancient and noble family, and born at Dole in the year 1600. He was attorney-general in the parliament of Dole; during which time he had a hand in all the state negotiations which concerned the provinces. He was sent afterwards by Philip IV. to the diet of Ratibon, and from thence to the court of the emperor Ferdinand III. He was one of the plenipotentiaries of his Catholic majesty, at the conferences of Munster held in 1643; where, though all the other plenipotentiaries took place of him, yet it is said that he far exceeded them all in capacity. The king of Spain was particularly beholden to him for the peace which the Dutch made at Munster, exclusively of France; and the intriguing turn which he shewed upon this occasion made him dreaded ever after by French ambassadors. He was a man of letters, as well as of politics; and therefore employed his pen, as well as his tongue, in the service of his master. He died at the Hague, during his embassy, in the year 1654.

BRUN (Charles le), was descended of a family of distinction in Scotland, and born in the year 1619. His father was a statutory by profession. He discovered, it is said, such an early inclination for painting, that at three years of age he used to take coals, and design on the hearth and sides of the chimney, only by the light of the fire; and at 12 he drew the picture of his uncle so well, that it still passes for a fine piece. His father being employed in the gardens at Sequier, and having brought his son along with him, the chancellor of that name took a liking to him, and placed him with Simon Vouet, an eminent painter. He was afterwards

sent to Fountainbleau, to take off some of Raphael's pieces. He went him next to Italy, and supported him there for six years. Le Brun, in his return, met with the celebrated Poussin, by whose conversation he greatly improved himself in his art, and contracted a friendship with him which lasted as long as their lives. A painting of St Stephen, which he finished in 1651, raised his reputation to the highest pitch. Soon after this, the king, upon the representation of Mr Colbert, made him his first painter, and conferred on him the order of St Michael. His majesty employed two hours every day to see him work, while he was painting the family of Darius at Fountainbleau. About the year 1662, he began his five large pieces of the history of Alexander the Great, in which he is said to have set the actions of that famous conqueror in a more glorious light than Quintus Curtius hath done in his history. He procured several advantages for the royal academy of painting and sculpture at Paris, and formed the plan of another for the students of his own nation at Rome. There was scarce any thing done for the advancement of the fine arts in which he was not consulted. It was thro' the interest of M. Colbert that the king gave him the direction of all his works, particularly of his royal manufactory at the Gobelins, where he had a handsome house with a genteel salary assigned to him. He was also made director and chancellor of the royal academy, and shewed the greatest zeal to encourage the fine arts in France. He was endowed with a vast inventive genius, which extended itself to arts of every kind. He was well acquainted with the manners and history of all nations. Besides his extraordinary talents, his behaviour was so genteel, and his address so pleasing, that he attracted the regard and affection of the whole court of France, where, by the places and pensions conferred on him by the king's liberality, he made a very considerable figure. Le Brun was the author of two treatises; one on physiognomy, and the other on the different characters of the passions. He died at Paris in 1690.

The talent of this painter, except for landscapes, was universal. He was not indeed admired for his colouring, nor for his skill in the distribution of his lights and shadows; but for a good gusto of design, an excellent choice of attitudes, an agreeable management of his draperies, a beautiful and just expression, and a strict observance of decorum. In fine, his compositions demand the attention and admiration of the nicest judges. The pieces that gained him greatest reputation were, besides what we have already mentioned, those which he finished at Fountainbleau, the great stair-case at Versailles, but especially the grand gallery there, which was the last of his works, and is said to have taken him up 14 years.

BRUNDISIUM, or BRUNDISIUM, (anc. geog.), a town of Calabria, with the best harbour in Italy. It was a very ancient town, and belonged originally to the Salentines; but was taken by the Romans about 256 years before Christ. Now *Brindisi*; which see.

BRUNO (Jordano), an atheistical writer, was born at Nolo in the kingdom of Naples; and about the year 1582, began to call in question some of the tenets of the Romish church, which occasioned his retiring to Geneva: but after two years stay there, he expressed his aversion to Calvinism in such a manner that he was expelled

Bruno
Brunswick.

pelled the city. After having staid some time at Lyons, Tholouse, and Paris, he came to London, and continued two years in the house of Mr Cailleau the French ambassador. He was very well received by queen Elizabeth and the politer part of the court. His principal friends were Sir Philip Sidney and Sir Fulk Greville. With these and some others of their club, Bruno held assemblies; but as they treated of subjects of a very delicate nature, which could not suit the taste or capacity of every body, they kept the door always shut, and none but select persons were admitted into their company. At Sir Philip's request, he composed his *Spaccio della Bestia Trionfante*, which was printed in 8vo, 1584, and dedicated to that gentleman. This work, which is remarkable for nothing but its impiety, we are told in one of the Spectators, (n^o 389), fold at an auction in London for 30l. From England he went to Wittemberg, and from thence to Prague, where he printed some tracts, in which he openly discovered his atheistical principles. After visiting some other towns in Germany, he made a tour to Venice. Here he was apprehended by order of the inquisition; tried; condemned; and refusing to retract, was burnt at the stake, February 9th 1600.

BRUNSBUTTLE, a sea-port town of Germany, in the circle of lower Saxony, and duchy of Holstein, seated at the mouth of the river Elbe, in E. Long. 8. 42. N. Lat. 44. 30. It is subject to Denmark.

BRUNSFELSIA, a genus of the monogynia order, belonging to the pentandria class of plants; of which there is only one species, viz. the americana. It rises with a woody, branching, rough stem, six or eight feet high; garnished with oblong entire leaves on footstalks, and large whitish flowers by threes or fours at the ends of the branches, succeeded by round saffron-coloured soft fruit. This plant may be raised from seeds sown in pots in the spring, and plunged in a bark-bed. It may also be propagated by cuttings planted in pots in the same season, plunging them also in a bark-bed or other hot-bed under glasses. The plants must always remain in the stove.

BRUNSWICK, a city of Germany, in the circle of Lower Saxony, and capital of the duchy of the same name. It is composed of five towns, viz. the Old Town, the New Town, the Hagen or Burg, the Old Wick, and the Sac, which makes it a large place, but the houses are almost all built of wood. There are several churches, one of which is an ancient Gothic building, but the appearance of its antiquity is almost absorbed by the repairs it has undergone. Brunswick is a fortified place, and would require a numerous army to besiege, and not a few men to defend it. It is of a square form, divided in the middle by the river Ocker. It is about two miles in circumference, and is strongly fortified. On the ramparts is a mortar-piece of brass, ten feet six inches long, and nine feet two inches in circumference, weighing 1800 quintals, and has 93 quintals of iron in its carriages. It will carry a ball of 730 pounds weight to the distance of 33,000 paces, and throw a bomb of a thousand weight; but it requires 52 pounds of powder for a charge. This city is the residence of the prince whom we style the duke of Brunswick Wolfenbuttle. The inhabitants of the city and parts adjacent carry on a considerable trade with Bohemia. Brunswick mum is well known in England; a

small fort of which is the common drink of the inhabitants of the city. The religion here is the Lutheran, and they observe it very strictly. The peasants are sober and laborious, but clownish and heavy; however, as they are robust and strong, they make good soldiers. The elector of Hanover is styled duke of Brunswick, though he has no property in, nor dominion over, this city, which belongs to the duke of Brunswick Wolfenbuttle. E. Long. 10. 28. N. Lat. 52. 15.

BRUNSWICK (the duchy of), is a country of Germany, bounded on the north by the duchy of Lunenburg; on the west, by the circle of Westphalia, from which it is separated by the river Weser; on the south, by Hesse, and the little territory of Peichfeld; and on the east, by Thuringia, with the principalities of Anhalt and Halberstadt, and the duchy of Magdeburg. The rivers are the Weser, the Ocker, and the Lyne; and it is fertile both in corn and pastures. It is divided into three principalities, Wolfenbuttle, Grubenhagen, and Calenberg, which also comprehends the duchy of Göttingen. The principality of Wolfenbuttle has its own dukes; but the other two belong to the elector of Hanover. The territories of the house of Brunswick are more extensive; the principal of which are the duchies of Brunswick and Lunenburg, with the county of Danneberg, which is annexed thereto. The rest are Blankenburg, Dieport, and Hoyer, besides two or three smaller districts.

BRUNTISLAND, a parliament-town of Fifeshire in Scotland, situated on the frith of Forth, eight miles north of Edinburgh, in W. Long. 3. 5. N. Lat. 56. 12. Here is the best harbour on the coast, formed by a rocky isle caked out with piers, for there are none on this side the county entirely natural. This is dry at low water. The church is square, with a steeple rising in the centre. The old castle, built by the *Duries*, commanded both town and harbour. The place has a natural strength, which, with the convenience of a port opposite to the capital, made it, during the troubles of 1560, a most desirable post. The French, allies of the queen regent, fortified it strongly. In 1715, it was surprised and possessed by the rebels, who here formed the bold design of passing over a body of troops to the opposite shore; which was in part executed, under the command of brigadier Macintosh, notwithstanding all the efforts of the men of war.

BRUSCHIUS (Gaspar), a Latin historian and poet, was born at Egra in Bohemia, in 1518. He was devoted to books from his childhood, and especially to poetry, in which he gained so much reputation, that he attained to the poetical crown, to the dignity of poet laureat, and of count palatine. He wrote with prodigious facility; and his verses are extremely flowing, easy, and natural. He published Latin poems on a great variety of subjects; the history of the bishops and bishoprics of Germany; history of German monasteries; and a great number of other works, of which a catalogue is given in Gesner's *Bibliothèque*. Bruschius was far from being rich, or rather he was very poor; subsisting almost entirely by the benefactions of his poetical patrons, and by presents from the abbots and abbesses whose monasteries he described. The liberalities of some abbots, while he was with Oporin at Basil, enabled him to buy a new suit of clothes; but when he found, that appearing well dressed in the streets procured

Brunswick
Bruschius.

red him many marks of respect from the vulgar, he tore his new finery to pieces, "as slaves that had usurped their master's honours." Bruchius seems to have been too great a philosopher for the age he lived in, or indeed for any age. He was murdered in the forest of Scalingenbach, between Rotterdam on the Tauber, and Winsheim; and it was believed that this assassination was concerted and carried into execution by some gentlemen against whom Bruchius was about to write something.

BRUSH, an assemblage of hairs, or hogs bristles, fastened in the holes of a wooden handle or board, pierced for that purpose, serving to cleanse divers bodies by rubbing therewith. The manner of making brushes is by folding the hair or bristle in two; and bringing it by means of a packthread, which is engaged in the fold, through the holes with which the wood is pierced all over, being afterwards fastened therein with glue. When the holes are thus filled, the ends of the hair are cut to make the surface even.

Shearmen's **BRUSH**, is made of wild boars bristles; and serves to lay the wool or nap of cloth, after shearing it for the last time.

BRUSH, among painters, a larger and coarser kind of a pencil made of hogs bristles, wherewith to lay the colours on their large pieces. The Chinese painters brush consists of the stalk of a plant; whose fibres being fretted at both ends, and tied again, serve for a brush.

Wire-Brushes, are used by silver smiths and gilders, for scrubbing silver, copper, or brass pieces, in order to the gilding of them.

BRUSSELS, the capital of Brabant, in the Austrian Netherlands, and generally the seat of the Austrian governor, is situated on the small river Senne, which runs through it. It is a rich and handsome city; and among the public structures, the ducal palace where the governor resides, the town-house, and the arsenal, are most superb. No city in Europe, except Naples and Genoa, makes a finer appearance at a distance: but, like them, when in the town, it is all up and down hill. It is encompassed with a double brick wall, and has seven gates; but being seven miles in compass, is too large to hold out a long siege. In Brussels are seven fine squares, or market-places; that of the great market is one of the most beautiful in the world. The town-house takes up one quarter of it; and has a very high steeple, on the top of which is a brazen statue of St Michael, fifteen feet high. In one of the apartments, which is handsomely adorned, the states of Brabant meet. In three other rooms there is the history of the reign of Charles V. wrought in tapestry; which is so well done, that it may be mistaken for painting. In the other parts of this square, are the halls of the different trades. There are here several palaces of the nobility: that of Orange now belongs to the king of Prussia. The opera-house is built after the Italian manner, with rows of boxes, in which are chimneys. One is covered over with looking glass, so that they can sit by the fire, drink a bottle, and see what is doing. There are 20 public fountains, adorned with statues, at the corners of the most public streets; and in the middle of the town-house is one with Neptune, the tritons, and the horses spouting out water from their nostrils. The hospitals are well endowed, some of which are for

the maintenance of strangers for three days. There is also a foundling-hospital, and one for penitent court-tezans. Among the churches, that of St Gudula is very magnificent. It stands on the top of a hill, near the gate of Lovain, and is surrounded with iron balustrades. It is an old Gothic structure, with two large steeples at the east end, and is finely adorned within. The Jesuits have a fine church as well as a library. There are several monasteries and nunneries, two of which last are English. The nunnery called the Beaguinage is like a little town, being surrounded by a wall and ditch, and has little streets, where each nun has an apartment. Six or seven hundred girls are educated here.

In 1695, Brussels was bombarded by marshal Villeroy, who demolished four thousand houses, the stadthouse, and several churches. In 1708, it was besieged again, by the elector of Bavaria; but the duke of Marlborough soon came to its assistance, and obliged him to raise the siege with precipitation. Marshal Saxe, the French general, took it in 1746; but it was restored by the treaty of Aix la Chapelle. It is much fallen from its former splendor; and all the trade which is carried on there is in lace, camblets, and tapestry, which they make in great perfection. E. Long. 4. 8. N. Lat. 50. 51.

BRUSSELS (the quarter or district of), is one of the four parts of the duchy of Brabant. This quarter is bounded on the east, by that of Louvain; on the north, by that of Antwerp; on the west, by Flanders; and on the south, by Hainhalt. Brussels is the capital city of this quarter and all Brabant.

BRUTE, a general name for all animals, except mankind.

Among brutes, the monkey kind bear the nearest resemblance to man; both in the external shape and internal structure, but more in the former than in the latter. In the monkey kind, the highest, and the nearest approach to the likeness of man is the *Oran Outang*, or *Homo Silvestris* †.—The structure and economy of brutes make the objects of what is called *Comparative Anatomy*. See that article. † See *Simio*.

Philosophers have been much puzzled about the essential characteristics of brutes, by which they may be distinguished from man. Some define a brute to be an animal not risible, or a living creature incapable of laughter; others call them *mute animals*. The peripatetics allowed them a sensitive power, but denied them a rational one. The Platonists allowed them reason and understanding, though in a degree less pure and refined than that of men. Laërtius allows every thing to brutes which men have, except a sense of religion; and even this has been ascribed to them by some sceptics. Descartes maintained that brutes are mere inanimate machines, absolutely destitute not only of reason, but of all thought and perception, and that all their actions were only consequences of the exquisite mechanism of their bodies. This system, however, is much older than Descartes; it was borrowed by him from Gomez Pereira, a Spanish physician, who employed 30 years in composing a treatise which he entitled *Antoniana Margarita*, from the Christian names of his father and mother. It was published in 1554: but his opinion had not the honour of gaining partizans, or even of being refuted; so that it died with him. Even Pereira

Brute.

Pereira seems not to have been the inventor of this notion; something like it having been held by some of the ancients, as we find from Plutarch and St Augustin. Others, who rejected the Cartesian hypotheses, have maintained that brutes are endowed with a soul essentially inferior to that of men; and to this soul some have allowed immortality, others not. And, lastly, in a treatise published by one Bougeant a Jesuit, entitled *A Philosophical amusement on the language of beasts*, he affirms that they are animated by evil spirits or devils.

The opinion of Descartes was probably invented, or at least adopted, by him to defeat two great objections: one against the immortality of the souls of brutes, if they were allowed to have any; the other against the goodness of God, in suffering creatures who had never sinned, to be subjected to so many miseries. The arguments in favour of it may be stated as follow. 1. It is certain, that a number of human actions are merely mechanical; because they are done imperceptibly to the agent, and without any direction from the will; which are to be ascribed to the impression of objects and the primordial disposition of the machine, wherein the influence of the soul has no share; of which number are all habits of the body acquired from the reiteration of certain actions. In all such circumstances, human beings are no better than automata. 2. There are some natural movements so involuntary, that we cannot restrain them; for example, that admirable mechanism ever on the watch to preserve an equilibrium, when we stoop, bend, or incline our bodies in any way, and when we walk upon a narrow plank. 3. The natural liking for, and antipathy against, certain objects, which in children precede the power of knowing and discriminating them, and which sometimes in grown persons triumph over all the efforts of reason; are all phenomena to be accounted for from the wonderful mechanism of the body, and are so many cogent proofs of that irresistible influence which objects have on the human frame. 4. Every one knows how much our passions depend on the degree of motion into which the blood is put, and the reciprocal impressions caused by the animal-spirits between the heart and brain, that are so closely connected by their nerves; and if such effects may be produced by such simple mechanical means as the mere increase of motion in the blood, without any direction of the will, we are not to wonder at the actions of brutes being the effects only of a refined mechanism, without thought, or perception. 5. A farther proof will arise from a consideration of the many wonderful effects which even the ingenuity of men has contrived to bring about by mechanical means; the androide, for instance, of Mr Kempell, which plays at chess. Now it is not to be questioned, but that the mechanism of the body of the meanest animal infinitely surpasses that of Mr Kempell's machine; and what can be the consequence of this, but that the actions of that animal must be proportionally more surprising than those of the wooden chess-player?

The above is a short abstract of all the arguments that are brought in favour of the Cartesian system: but they are evidently very far from being conclusive. They are deficient, in the first place, because, though we allow them in the utmost extent the Cartesians themselves can desire, they prove only the possibility of brutes being inanimate, and that the power of God actually

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could produce such and such actions from inanimate machines; but that he actually hath done so, they have not the least tendency to prove. In the second place, the Cartesian argument is insufficient, because it hath no limits, and knows not where to stop; for, by the same method of arguing, every man might prove his neighbour to be an inanimate machine: for though every individual is conscious of his own thoughts, he is not so of those of his neighbours, and it no more exceeds the power of God to cause an inanimate machine perform the actions of a man, than those of a beast. Neither are the two objections which the hypothesis is calculated to answer, to be at all admitted as arguments in its favour. They are, 1. That if we allow brutes to have souls, they must be immaterial, and consequently immortal; and, 2. It seems a contradiction to the goodness of God to think that he should subject innocent creatures to such a multitude of evils as we see the brute creation endure in this world. The first of these is productive of no bad consequences to us, though it should be granted: and if it is supposed that the brute creatures are really immortal, the second objection vanishes; because, in the enjoyment of endless felicity, all temporary afflictions, how severe soever, must be swallowed up as though they had never been.

As to a positive proof on the other side, viz. that brutes are really endowed with sensation and consciousness, there is undoubtedly the same evidence for the sensibility of brutes, that there is for that of mankind. We see brutes avoid pain as much as we do; and we likewise see them seek for pleasure and express their happiness in the enjoyment of certain things by signs not at all equivocal. Therefore, though we grant the possibility of all this being the effect of mere mechanism; yet as we are conscious that in ourselves similar effects are produced by a sentient principle, we have all the reason in the world to conclude that in brutes they are likewise derived from a principle of sensation: especially seeing we know of no kind of mechanism in any other part of nature that produces any thing like the effects just mentioned; and until we see that a mechanism of this kind does take place in some part of nature, we have no right to suppose it in any. As to those actions of the human body in which it seems to move spontaneously, like an automaton, without the direction of the mind or will, it is almost superfluous to observe, that they were not performed in this manner originally, but required very great exertions of the will and intellectual faculty before the body could be brought to perform them easily; so that from this nothing can be inferred. Add to this, that divine revelation sets forth to us in many places, the brute creation as objects of mercy; which could not be done without the highest absurdity, if they were not really capable of feeling pleasure and pain as well as we.

The most rational opposers of the Cartesian scheme maintain, that brutes are endowed with a principle of sensation as well as we; though of an inferior nature to ours. Great disputes, however, have arisen on this subject; some-maintaining, that the soul of brutes is merely sensitive, and that they are altogether destitute of reflection and understanding; others, that they not only reason, but make a better use of it than men do. That the brutes are endowed only with sensation, and totally destitute of all power of reflection, or even rea-

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soning, is what can by no means be maintained on good grounds: neither can it be asserted that they act entirely from instinct, or a blind propensity to certain things without knowing why or wherefore. In numberless instances, needless to be mentioned here, but which will readily occur to every reader, it is evident, that education will get the better of many of the natural instincts of brutes; which could never be the case were they absolutely incapable of reasoning. On the other hand, it is equally certain, that they are by no means capable of education in the same degree that men are; neither are the rational exertions of beasts at all to be compared even with those of the meanest savages. One remarkable instance of this is in the use of the element of fire. The most savage nations have known how to make this element subservient to their purposes; or if some have been found who have been entirely ignorant of its existence, they have quickly learned its uses on seeing it made use of by others: but though many of the brute creatures are delighted with warmth, and have opportunities every day of seeing how fire is supplied with fuel, and by that means preserved, it never was known that one of them attempted to preserve a fire by this means. This shews a strange defect of rationality, unaccountable upon any other supposition than that the soul or sentient principle of brutes is some how or other inferior in its nature to that of man; but still, it is a sentient principle, capable of perceptions as quick, and in many instances much more so than our own.

Father Bougeant supports his opinion of the spirits of brute creatures being devils, in the following manner. Having proved at large that beasts naturally have understanding, "Reason (says he) naturally inclines us to believe that beasts have a spiritual soul; and the only thing that opposes this sentiment is, the consequences that might be inferred from it. If brutes have a soul, that soul must be either matter or spirit; it must be one of the two, and yet you dare affirm neither. You dare not say it is matter, because you must then necessarily suppose matter to be capable of thinking; nor will you say that it is spirit, this opinion bringing with it consequences contrary to the principles of religion; and this, among others, that man would differ from beasts only by the degrees of plus and minus; which would demolish the very foundation of all religion. Therefore, if I can elude all these consequences; if I can assign to beasts a spiritual soul, without striking at the doctrines of religion; it is evident, that my system, being moreover the most agreeable to reason, is the only warrantable hypothesis. Now I shall, and can do it, with the greatest ease imaginable. I even have means, by the same method, to explain many very obscure passages in the Holy Scripture, and to resolve some very great difficulties which are not well confuted. This we shall unfold in a more particular manner.

"Religion teaches us, that the devils, from the very moment they had sinned, were reprobate, and that they were doomed to burn for ever in hell; but the church has not yet determined whether they do actually endure the torments to which they are condemned. It may then be thought that they do not yet suffer them, and that the execution of the verdict brought against them is referred for the day of the final judgment.—Now what I pretend to infer from hence is, that, till

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doomday comes, God, in order not to suffer so many legions of reprobate spirits to be of no use, has distributed them through the several spaces of the world, to serve the designs of his Providence, and make his omnipotence to appear. Some, continuing in their natural state, busy themselves in tempting men, in seducing and tormenting them; either immediately, as Job's devil, and those that lay hold of human bodies; or by the ministry of forerunners or phantoms. These wicked spirits are those whom the scripture calls the *powers of darkness*, or the *powers of the air*. God, with the others, makes millions of beasts of all kinds, which serve for the uses of men, which fill the universe, and cause the wisdom and omnipotence of the Creator to be admired. By that means I can easily conceive, on the one hand, how the devils can tempt us; and on the other, how beasts can think, know, have sentiments, and a spiritual soul, without any way striking at the doctrines of religion. I am no longer surprised to see them have forecast, memory, and judgment. I should rather have occasion to wonder at their having no more, since their soul very likely is more perfect than ours. But I discover the reason of this: it is because, in beasts as well as in ourselves, the operations of the mind are dependent on the material organs of the machine to which it is united; and those organs being grosser and less perfect than in us, it follows, that the knowledge, the thoughts, and the other spiritual operations of the beasts must of course be less perfect than ours. And if these proud spirits know their own dismal state, what an humiliation must it be to them thus to see themselves reduced to the condition of beasts! But, whether they know it or no, so shameful a degradation is still, with regard to them, the primary effect of the divine vengeance I just mentioned; it is an anticipated Hell.—

Having mentioned the prejudices against this hypothesis, such as particularly the pleasure which people of sense and religion take in beasts and birds, especially all sorts of domestic animals; he proceeds, "Do we love beasts for their own sakes? No. As they are altogether strangers to human society, they can have no other appointment but that of being useful and amusing. And what care we whether it be a devil or any other creature that amuses us? The thought of it, far from shocking, pleases me mightily. I with gratitude admire the goodness of the Creator, who gave me so many little devils to serve and amuse me. If I am told that these poor devils are doomed to suffer eternal tortures, I admire God's decrees, but I have no manner of share in that dreadful sentence; I leave the execution of it to the sovereign Judge; and, notwithstanding this, I live with my little devils as I do with a multitude of people, of whom religion informs me that a great number shall be damned. But the cure of a prejudice is not to be effected in a moment; it is done by time and reflection; give me leave then lightly to touch upon this difficulty, in order to observe a very important thing to you.

"Persuaded as we are that beasts have intelligence, have we not all of us a thousand times pitied them for the excessive evils which the majority of them are exposed to, and in reality suffer? How unhappy is the condition of horses! we are apt to say upon seeing a horse whom an unmerciful carman is murdering with blows.

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Brute.

How miserable is a dog whom they are breaking for hunting! How dismal is the fate of beasts living in woods! they are perpetually exposed to the injuries of the weather; always seized with apprehensions of becoming the prey of hunters, or of some wilder animal; forever obliged, after long fatigue, to look out for some poor insipid food; often suffering cruel hunger; and subject, moreover, to illness and death! If men are subject to a multitude of miseries that overwhelm them, religion acquaints us with the reason of it; viz. the being born sinners. But what crimes can beasts have committed by birth to be subject to evils so very cruel? What are we, then, to think of the horrible excesses of miseries undergone by beasts? miseries, indeed, far greater than those endured by men. This is, in any other system, an incomprehensible mystery; whereas nothing is more easy to be conceived from the system I propose. The rebellious spirits deserve a punishment still more rigorous, and happy it is for them that their punishment is deferred. In a word, God's goodness is vindicated, man himself is justified: for what right can we have, without necessity, and often in the way of mere diversion, to take away the life of millions of beasts, if God had not authorized us so to do? And beasts being as sensible as ourselves of pain and death, how could a just and merciful God have given man that privilege, if they were not so many guilty victims of the divine vengeance?

"But hear still something more convincing, and of greater consequence: Beasts, by nature, are extremely vicious. We know well that they never sin, because they are not free; but this is the only condition wanting to make them sinners. The voracious birds and beasts of prey are cruel. Many insects of one and the same species devour one another. Cats are perfidious and ungrateful; monkeys are mischievous; and dogs envious. All beasts in general are jealous and revengeful to excess; not to mention many other vices we observe in them: and at the same time that they are by nature so very vicious, they have, say we, neither the liberty nor any helps to resist the bias that hurries them into so many bad actions. They are, according to the schools, necessitated to do evil, to disconcert the general order, to commit whatever is in nature most contrary to the notion we have of natural justice and to the principles of virtue. What monsters are these in a world originally created for order and justice to reign in? This is, in good part, what formerly persuaded the Manicheans that there were of necessity two orders of things, one good, and the other bad; and that the beasts were not the work of the good principle: a monstrous error! But how then shall we believe that beasts came out of the hands of their Creator with qualities so very strange? If man is so very wicked and corrupt, it is because he has himself through sin perverted the happy nature God had given him at his creation. Of two things, then, we must say one: either that God has taken delight in making beasts so vicious as they are, and of giving us in them models of what is most shameful in the world; or that they have, like man, original sin, which has perverted their primitive nature.

"The first of these propositions finds very difficult access to the mind, and is an express contradiction to the holy scriptures; which say, that whatever came out

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of God's hands, at the time of the creation of the world, was good, yea very good. What good can there be in a monkey's being so very mischievous, a dog so full of envy, a cat so malicious? But then many authors have pretended, that beasts, before man's fall, were different from what they are now; and that it was in order to punish man that they became so wicked. But this opinion is a mere supposition of which there is not the least footing in Holy Scripture. It is a pitiful subtlety to elude a real difficulty: this at most might be said of the beasts with whom man has a sort of correspondence; but not at all of the birds, fishes, and insects, which have no manner of relation to him. We must then have recourse to the second proposition, That the nature of beasts has, like that of man, been corrupted by some original sin: Another hypothesis, void of foundation, and equally inconsistent with reason and religion, in all the systems which have been hitherto espoused concerning the soul of beasts. What party are we to take? Why, admit of my system, and all is explained. The souls of beasts are refractory spirits which have made themselves guilty towards God. The sin in beasts is no original sin; it is a personal crime, which has corrupted and perverted their nature in its whole substance; hence all the vices and corruption we observe in them, though they can be no longer criminal, because God, by irreversibly reprobating them, has at the same time divested them of their liberty."

These quotations contain the strength of father Bougeant's hypothesis, which also hath had its followers; but the reply to it is obvious. Beasts, though remarkably mischievous, are not completely so; they are in many instances capable of gratitude and love, which devils cannot possibly be. The very same passions that are in the brutes, exist in the human nature; and if we chose to argue from the existence of those passions, and the ascendancy they have over mankind at some times, we may say with as great justice, that the souls of men are devils, as that the souls of brutes are. All that can be reasonably inferred from the greater prevalence of the wicked passions among the brutes than among men, is, that the former have less rationality than men; and accordingly it is found, that among savages, who exercise their reason less than other men, every species of barbarity is practised, without being thought a crime.

It has been much disputed whether the brutes have any language whereby they can express their minds to each other; or whether all the noise they make consists only of cries inarticulate, and unintelligible even to themselves. We are, however, too little acquainted with the intellectual faculties of these creatures to be able to determine this point. Certain it is, that their passions, when excited, are generally productive of some peculiar cry; but whether this is designed as an expression of the passion to others, or only a mechanical motion of the muscles of the larynx occasioned by the passion, is what we have no means of knowing. We may indeed, from analogy, conclude, with great reason, that some of the cries of beasts are really expressions of their sentiments; but whether one beast is capable of forming a design, and communicating that design by any kind of language to others, is what we submit to the judgment of the reader, after giving the

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* See Law-
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following instance which among others is brought as a proof of it by father Bougeant. "A sparrow finding a nest that a martin had just built, standing very conveniently for him, possessed himself of it. The martin, seeing the usurper in her house, called for help to expel him. A thousand martins came full speed, and attacked the sparrow; but the latter being covered on every side, and presenting only his large beak at the entrance of the nest, was invulnerable, and made the boldest of them who durst approach him repent of their temerity. After a quarter of an hour's combat, all the martins disappeared. The sparrow thought he had got the better, and the spectators judged that the martins had abandoned their undertaking. Not in the least. Immediately they returned to the charge; and each of them having procured a little of that tempered earth with which they make their nests, they all at once fell upon the sparrow, and inclosed him in the nest to perish there, though they could not drive him thence. Can it be imagined that the martins could have been able to hatch and concert this design all of them together, without speaking to each other?"

BRUTII, an ancient people of Italy, inhabiting the country now called *Calabria Ultra*; different from the ancient Calabria, or Messapia, to the east on the Adriatic or Ionian sea.

BRUTTON, a town of Somersetshire, in England. It is situated on the river Brew; and is a good place, and well inhabited. It is adorned with a very beautiful church; has a free school, founded by Edward I.; and the alms-house or hospital is so good, that it has the appearance of a college. They have a woollen manufactory of cloth and ferges, and they are likewise noted for their malt. W. Long. 2. 30. N. Lat. 51. 15.

BRUTUS, or BRUTE, according to the old exploded history of this country by Geoffrey of Monmouth, was the first king of Britain. He is said to have been the son of Sylvius, and he of Ascanius the son of Æneas, and born in Italy: killing his father by chance, he fled into Greece, where he took king Pandrusus prisoner, who kept the Trojans in slavery, whom he released on condition of providing ships, &c. for the Trojans to forsake the land. Being advised by the oracle to sail west beyond Gaul, he, after some adventures, landed at Totnes in Devonshire. Albion was then inhabited by a remnant of giants, whom Brutus destroyed; and called the island, after his own name, *Britain*. He built a city called *New Troy*, since London; and having reigned here 24 years, at his death parcelled the island among his three sons: Loocrine had the middle, called *Loegria*; Camber had Wales, and Albanact Scotland.

BRUTUS (Lucius Junius), the avenger of the rape of Lucretia, and founder of the Roman republic, flourished 509 years before Christ. See (*History of*) ROME.

BRUTUS (Marcus), the passionate lover of his country, and chief conspirator against Cæsar, slew himself on losing the battle of Philippi, 42 years before Christ*.

BRUTUS (John Michael), a man of learning, and a polite writer, in the 16th century. He was a native of Venice; and, having studied at Padua, spent great part of his life in travelling, and became historiographer to his imperial majesty. He wrote, 1. A history of Hungary. 2. A history of Florence. 3. Notes on Horace, Cæsar, Cicero, &c.; and other works. He was living

in the year 1590.

BRUTUS (Stephen Junius), the disguised author of a political work intitled *Vindicia contra tyrannos* *.

BRUYERE (John de la), a celebrated French author, was born at Dourdan in the year 1664. He wrote Characters, describing the manners of his age, in imitation of Theophrastus; which characters were not always imaginary or general, but descriptive, as was well known, of persons of considerable rank. In the year 1693, he was by an order of the king chosen a member of the French academy; and died in the year 1696.—“The Characters of Bruyere (says the celebrated Voltaire) may justly be ranked among the extraordinary productions of this age. Antiquity furnishes no examples of such a work. A style rapid, concise, and nervous; expressions animated and picturesque; an use of language altogether new, without offending against its established rules, struck the public at first; and the allusions, which are crowded in almost every page, completed its success. When La Bruyere showed his work in manuscript to Malesieu, this last told him, that the book would have many readers, and its author many enemies. It somewhat sunk in the opinion of men, when that whole generation whose follies it attacked were passed away; yet, as it contains many things applicable to all times and places, it is more than probable that it will never be forgotten.” *Age of Lewis XIV.* chap. 29.

BRUYERS, a town of Lorraine, in Vosque, with a provostship. E. Long. 6. 45. N. Lat. 48. 15.

BRYANS-BRIDGE, a town of Ireland, in the county of Clare and province of Connaught, seated on the river Shannon, eight miles north of Limerick. W. Long. 8. 30. N. Lat. 52. 31.

BRYANT (Sir Francis), a soldier, statesman, and a poet of no inconsiderable fame in his time, was born of a genteel family, educated at Oxford, and afterwards spent some time in travelling abroad. In the year 1522, the 14th of Henry VIII. he attended, in a military capacity, the earl of Surrey on his expedition to the coast of Brittany; and commanded the troops in the attack of the town of Morlaix, which he took and burnt. For this service he was knighted on the spot by the earl. In 1528, he was in Spain; but on what service, is doubtful. In 1529, he was sent ambassador to France; and, the year following, to Rome on account of the king's divorce. He had also been there in 1522, in the same capacity, when cardinal Woolsey's election to the holy see was in agitation. He was gentleman of the privy chamber to king Henry VIII. and to his successor Edward VI. in the beginning of whose reign he marched with the protector against the Scots; and after the battle of Musselburgh, in which he commanded the light horse, was made banneret. In 1548, he was appointed chief governor of Ireland, where he married the countess of Ormond. He died soon after, and was buried at Waterford. He wrote, 1. Songs and sonnets; some of which were printed with those of the earl of Surrey and Sir Thomas Wyatt. Lond. 1565. 2. Letters written from Rome concerning the king's divorce, manuscript. 3. Various letters of state; which Ant. Wood says he had seen. 4. A dispraise of the life of a courtier, &c. Lond. 1548, 8vo. from the French of Aylagry, who translated it from the Castilian language, in which it was originally written by Guevara.

BRY-

* See (His-
tory of)
Rome.

Bryennius
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Bryonia.

BRYENNIUS (Manuel), a Greek writer on music, is supposed to have flourished under the elder Paleologus, viz. about the year of Christ 1120. He wrote three books on Harmonics; the first whereof is a kind of commentary on Euclid, as the second and third are on Ptolemy. He professes to have studied peripatetic for the sake of young men. Meibomius had given the public expectations of a translation of this work: but not living to complete it, Dr Wallis undertook it; and it now makes a part of the third volume of his works, published at Oxford in three volumes folio, 1699.

BRYENNIUS (Nicephorus), a prince distinguished by his courage, probity, and learning, was born at Orestia in Macedonia; where his father by rebellion provoked the emperor to send his general Alexis Comnenus against him, who ordered his eyes to be pulled out; but being charmed with his son Bryennius, he married him to Anne Comnenus his daughter, so famous by her writings. When Alexis came to the throne, he gave Bryennius the title of *Cæsar*; but would not declare him his successor, though solicited to it by the empress Irene; and was therefore succeeded by his son John Comnenus, to whom Bryennius behaved with the utmost fidelity. Being sent, about the year 1137, to besiege Antioch, he fell sick; and, returning, died at Constantinople. This prince wrote the *History of Alexis Comnenus*, which he composed at the request of his mother-in-law the empress Irene.

BRYGMUS, among physicians, a grating noise made by the gnashing of the teeth.

BRYONIA, **BRYONY**; a genus of the syngenesia order, belonging to the monœcia class of plants.

Species. 1. The alba, rough or white bryony with red flowers, is a native of dry banks under hedges in many parts of Britain. The roots of this plant have by impostors been brought into a human shape, and shewn for mandrakes. The method practised by these people was to find a young thriving plant of bryony; then they opened the earth all round, being careful not to disturb the lower fibres; and being provided with such a mould as is used for making plaster figures, they fixed the mould close to the root, fastening it with wire to keep it in its proper situation: then they filled the earth about the root, leaving it to grow to the shape of the mould; which in one summer it will do; so that if this is done in March, by September it will have the shape. The leaves of this plant are also imposed on people for mandrake-leaves; although there is no resemblance between them, nor any agreement in quality. 2. The africana, or African tuberous rooted bryony. 3. The racemosa, or bryony with a red olive-shaped fruit. These are natives of warm climates; and are perennial; but their branches decay every winter. They flower in July, and in warm summers will perfect their seeds in Britain. 4. The cretica, or spotted bryony of Crete. 5. The variegata, or American bryony with a variegated fruit. 6. The bonariensis, or bryony with hairy palmated leaves, divided into five parts, and obtuse segments. These are likewise natives of warm countries; but merit cultivation on account of the pretty appearance they make when the plants are full of fruit.

Culture. The second and third sorts are to be planted in pots filled with fresh light earth; and in winter must be placed in the green-house to protect them from frosts and great rains, which would destroy them if they were

Bryonia
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Bubble.

exposed thereto. In summer, they may be exposed to the open air, and must be frequently refreshed with water in dry weather. The three last sorts are annual plants: they must be raised on a hot-bed early in the spring; and when the plants are about three inches high, they should be each transplanted into a small pot, and plunged into a hot-bed of tanner's bark. When the plants are grown so large as to ramble about on the surface of the bed, and begin to entangle with other plants, they should be shifted into larger pots, and placed in the bark-stove; where their branches may be trained to the wall, or against an espalier, that they may have fun and air, which is absolutely necessary for their producing fruit.

Medicinal Uses, &c. The roots of the first species are used in medicine. These are very large, sometimes as thick as a man's thigh: their smell, when fresh, is strong and disagreeable; the taste nauseously bitter, acrid, and biting; the juice is so sharp, as in a little time to excoriate the skin; in drying, they lose great part of their acrimony, and almost their whole scent.—Bryony-root is a strong irritating cathartic; and as such has sometimes been successfully exhibited in maniacal cases, in some kinds of dropsies, and in several chronic disorders, where a quick solution of viscid juices, and a sudden stimulus on the solids, were required. An extract prepared by water acts more mildly, and with greater safety, than the root in substance: given from half a dram to a dram, it is said to prove a gentle purgative, and likewise to operate powerfully by urine.—Bryony-root, applied externally, is said to be a powerful discutient: it enters a cataplasm for that purpose in the Edinburgh Pharmacopœia. See PHARMACY, n° 931.

Black Bryony. See TAMUS.

BRYUM, in botany, a genus of the cryptogamia musci class. The anthera is covered with an operculum; the calyptra is smooth. There are 41 species, most of them natives of Britain.

BUA, an island of the gulph of Venice, on the coast of Dalmatia, near the town of Trau; called likewise the *Partridge-island*, because frequented by those birds.

BUANES, a town of France, in Gascony, and in the diocese of Aire, seated on the river Bahus, in E. Long. o. 5. N. Lat. 43. 47.

BUARCOS, a town of Portugal, in the province of Beira. W. Long. 8. 5. N. Lat. 40. 3.

BUBALIS, in zoology, the trivial name of the buffalo, a species of the bos. See BOS.

BUBBLE, in philosophy, small drops or vesicles of any fluid filled with air; and formed either on its surface by an addition of more of the fluid, as in raining, &c.; or in its substance, by an intestine motion of its component particles. Bubbles are dilatable or compressible, *i. e.* they take up more or less room as the included air is more or less heated, or more or less pressed from without; and are round, because the included air acts equally from within all around.

BUBBLE, in commerce, a cant term given to a kind of project for raising money on imaginary grounds, much practised in France and England in the years 1719, 1720, and 1721.

The pretence of those schemes was the raising a capital for retrieving, setting on foot, or carrying on, some promising and useful branch of trade, manufacture, machinery, or the like. To this end proposals

were

Rubo,
Rubon.

were made out, shewing the advantages to be derived from the undertaking, and inviting persons to be engaged in it. The sum necessary to manage the affair, together with the profits expected from it, were divided into shares or subscriptions, to be purchased by any disposed to adventure therein.

Bubbles, by which the public have been tricked, are of two kinds, viz. 1. Those which we may properly enough term *trading-bubbles*; and, 2. Stock or fund bubbles. The former have been of various kinds; and the latter at different times, as in 1719 and 1720.

BUBO, in ornithology, the trivial name of a species of strix. See STRIX.

BUBO, or *Buboe*, in surgery, a tumour which arises, with inflammation, only in certain or particular parts to which they are proper, as in the arm-pits and in the groins. See (the *Index* subjoined to) MEDICINE.

BUBON, MACEDONIAN PARSLEY; a genus of the dignyna order, belonging to the pentandria class of plants.

Species. 1. The macedonicum sends out many leaves from the root; the lowest of which grow almost horizontally, spreading near the surface of the ground: the foot-stalk of each leaf divides into several smaller; which are garnished with smooth rhomb-shaped leaves, which are of a bright pale-green colour, and sawed on their edges. In the centre of the plant arises the flower-stem, which is little more than a foot high, dividing into many branches, each being terminated by an umbel of white flowers, which are succeeded by oblong hairy seeds. This plant, in warm countries, is biennial; the plants, which rise from seeds, one year produce flowers, and seeds the next, and then perish; but in Britain they seldom flower till the third or fourth year from the seed; but whenever the plant flowers, it always dies. 2. The rigidus, hard or rigid ferula, is a native of Sicily. It is a low perennial plant, having short, stiff, and very narrow leaves: the flower-stalk rises a foot high, which is terminated by an umbel of small white flowers; which are succeeded by small, oblong, channelled seeds. It is a plant of little beauty or use, so is only cultivated for the sake of variety. 3. The galbanum, or African ferula, rises with an upright stalk to the height of eight or ten feet, which at bottom is woody, having a purplish bark covered with a whitish powder that comes off when handled. The upper part of the stalk is garnished with leaves at every joint, the foot-stalks half-embracing them at their base, and are set with leaves like those of the lovage, but smaller, and of a grey colour: the top of the stalk is terminated by an umbel of yellow flowers; which are succeeded by oblong channelled seeds, which have a thin membrane or wing on their border. When any part of the plant is broken, there issues out a little thin milk of a cream colour, which hath a strong scent of galbanum. 4. The gummiferum, with a mock chervil leaf, rises with a ligulous stalk about the same height; and is garnished with leaves at each joint, which branch out like the former; but the small leaves or lobes are narrow and indented like those of balfard hemlock. The stalk is terminated by an umbel of small yellow flowers, which are succeeded by seeds like those of the former sort.—These plants are all propagated by seeds, and require the common culture of other exotic vegetables. The galbanum of the shops is supposed to be procured from

the third and fourth forts.

BUBONOCELE, or HERNIA INGUINALIS, in surgery, a tumour in the inguen, formed by a prolapsus of the intestines, omentum, or both, through the processes of the peritonæum and rings of the abdominal muscles. See SURGERY, n° 13.

BUBONIUM, in botany, a synonyme of the *INULA*.

BUC (George), a learned English antiquarian, flourished in the beginning of the 17th century. In the reign of king James I. he was made one of the gentlemen of his majesty's privy-chamber, and knighted: he was also constituted master of the revels. What he mostly distinguished himself by, was his writing, 1. The history of the reign of Richard III.; in which he takes great pains to wipe off the bloody stains that have blotched his character, and represents the person and actions of that prince in a much less odious light than other historians have done. He also wrote, 2. A treatise of the art of revels; and, 3. a work intitled *The third universitie of England*.

BUCANEER, one who dries and smokes flesh, or fish, after the manner of the Indians. The name was particularly given to the first French settlers on the island of St Domingo, whose sole employment consisted in hunting bulls or wild boars, in order to sell their hides and flesh. The name has also been applied to those famous piratical adventurers, chiefly English and French, who joined together to make depredations on the Spauiards of America. Of both these we shall give an account.

I. *The Bucaneers of St Domingo*. The Spaniards had not been long in the possession of the West-Indies and the continent of America, when other nations, especially the English and French, began to follow them there. But though the Spaniards were unable to people such extensive countries themselves, they were resolved that no others should do it for them; and therefore made a most cruel war on all those of any other nation, who attempted to settle in any of the Antilles or Caribbee Islands. The French, however, were at last lucky enough to acquire some footing in the island of St Christopher's; but by the time they began to subside into a regular form of government, the Spaniards found means to dislodge them. Upon this the wretched fugitives, considering at how great a distance they were from their mother-country, and how near to the island of Hispaniola or St Domingo, the northern parts of which were then uninhabited and full of swine and black cattle, they immediately resolved to take possession of that country, in conjunction with several other adventurers of their own and the English nation; especially as the Dutch, who now began to appear in these seas, promised to supply them plentifully with all kinds of necessities they might procure, in exchange for the hides and tallow by hunting.

These new settlers obtained the name of *bucaneers*, from their custom of buccanning their beef and pork in order to keep it for sale, or for their own consumption, the method of which will be presently described. But some of them soon grew tired of this new way of life, and took to planting; while many more chose to turn pirates, trusting to find, among those who remained on shore, a quick sale for all the plunder they could make at sea. This new body of adventurers were called *freebooters*, from their making free prey or booty of what

Bubonocela
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Bucaneer.

ever

Bucaneer. ever came in their way.

The colony now began to thrive at a great rate, by the cheap and easy manner in which the free-booters acquired the greatest riches, and the profusion with which they distributed them among their old companions the bucaniers and planters for the meereft trifles. This brought numbers of settlers from Old France in quality of indented servants, though they toiled rather like slaves during the three years for which they generally bound themselves. One of these men presuming to reprefent to his mafter, who always fixed upon a Sunday for fending him with skins to the port, that God had forbidden fuch a practice, when he had declared, "Six days shalt thou labour, and on the feventh day shalt thou reft:" "And I (replied the brutal bucanier) fay to thee, Six days shalt thou kill bulls, and ftrip them of their skins, and on the feventh day shalt thou carry their hides to the fea-shore." This command was followed by blows, which sometimes enforce obedience, sometimes difobedience to the laws of God.

Thus the colony confifted of four claffes: bucaniers; freebooters; planters; and indented servants, who generally remained with the bucaniers, or planters. And thefe four orders compofed what they now began to call the *body of adventurers*. Thefe people lived together in a perfect harmony under a kind of democracy: every freeman had a defpotic authority over his own family; and every captain was a fovereign in his own fhip, tho' liable to be difcarded at the difcretion of the crew.

The planters fettled chiefly in the little ifland of Tortuga on the northern coaft of Hifpaniola: but it was not long before fome of them going to the great ifland to hunt with the bucaniers, the reft were furprifed by the Spaniards; and all, even thofe who had furrendered at difcretion in hopes of mercy, were put to the fword, or hanged.

The next care of the Spaniards was to rid the great ifland of the bucaniers; and for this reafon they afsembled a body of 500 lance-men, who, by their feldom going fewer than 50 in a company, obtained the name of the *Fifties* from their enemies, whose manners and customs we fhall now enter upon.

The bucaniers lived in little huts built on fome fpofts of cleared ground, juft large enough to dry their skins on, and contain their buccanning houfes. Thefe fpofts they called *Boucan*, and the huts they dwelt in *Ajoupas*, a word which they borrowed from the Spaniards, and the Spaniards from the natives. Though thefe ajoupas lay open on all fides, they were very agreeable to the hardy inhabitants, in a climate where wind and air are fo very defirable things. As the bucaniers had neither wife nor child, they affociated by pairs, and mutually rendered each other all the fervices a mafter could reafonably expect from a fervant, living together in fo perfect a community, that the furvivor always fucceeded his deceased partner. This kind of union or fellowfhip they called *ſemateleto* [infailoring], and each other *matelet*, [failor], whence is derived the cuftom of giving, at leaft in fome parts of the French Antilles, the name *mateolatage* [failorage], to any kind of fociety formed by private perfons for their mutual advantage. They behaved to each other with the greateft juftice and opennefs of heart: it would have been a crime to keep any thing under lock and key; but, on the other hand, the leaft pilfering was unpardonable, and pu-

nifhed with expulſion from the community. And indeed there could be no great temptation to ſteal, when it was reckoned a point of honour, never to reſuſe a neighbour what he wanted; and where there was fo little property, it was impoſſible there ſhould be many diſputes. If any happened, the common friends of the parties at variance interpoſed, and ſoon put an end to the difference.

As to laws, the bucaniers acknowledged none but an odd jumble of conventions made between themſelves, which, however, they regarded as the ſovereign rule. They ſilenced all objections by coolly anſwering, that it was not the cuſtom of the coaſt; and grounded their right of acting in this manner, on their baptiſm under the tropic, which freed them, in their opinion, from all obligations antecedent to that marine ceremony. The governor of Tortuga, when that ifland was again fettled, though appointed by the French court, had very little authority over them; they contented themſelves with rendering him from time to time ſome ſlight homage. They had in a manner entirely ſhaken off the yoke of religion, and thought they did a great deal in not wholly forgetting the God of their fathers. We are ſurprifed to meet with nations, among whom it is a difficult matter to diſcover any trace of a religious worſhip: and yet it is certain, that had the bucaniers of St Domingo been perpetuated on the ſame footing they ſubſiſted at the time we are ſpeaking of, the third or fourth generation of them would have as little religion as the Caffres and Hottentots of Africa, or the Topinambous and Cannibals of America.

They even laid aside their ſurnames, and aſſumed nick-names, or martial names, moſt of which have continued in their families to this day. Many, however, on their marrying, which ſeldom happened till they turned planters, took care to have their real ſurnames inſerted in the marriage-contract; and this practice gave occaſion to a proverb, ſtill current in the French Antilles, *A man is not to be known till he takes a wife*.

Their dreſs conſiſted of a filthy greaſy ſhirt, dyed with the blood of the animals they killed; a pair of trowers ſtill more naſty; a thong of leather by way of belt, to which they hung a caſe containing ſome Dutch knives, and a kind of very ſhort fabre called *Manchette*; a hat without any brim, except a little flap on the front to take hold of it by; and ſhoes of hogſkin all of a piece. Their guns were four feet and a half in the barrel, and of a bore to carry balls of an ounce. Every man had his contract ſervants, more or fewer according to his abilities; beſides a pack of 20 or 30 dogs, among which there was always a couple of beagles. Their chief employment at firſt was ox-hunting; and, if at any time they chafed a wild hog, it was rather for paſtime, or to make proviſion for a feaſt, than for any other advantage. But, in proceſs of time, ſome of them betook themſelves entirely to hunting of hogs, whoſe fleſh they buccanned in the following manner: Firſt, they cut the fleſh into long pieces, an inch and an half thick, and ſprinkled them with ſalt, which they rubbed off after 24 hours. Then they dried theſe pieces in ſtoves over the fire made of the ſkin and bones of the beaſt, till they grew as hard as a board, and aſſumed a deep brown colour. Pork prepared in this manner will keep in caſks a twelvemonth and longer; and when ſteeped but a little while in lukewarm water, become plump

Bucaneer.

Bucaneer.

and rosy, and yield moreover a most grateful smell, either broiled or boiled, or otherwise dressed, enough to tempt the most languid appetite and please the most delicate palate. Those who hunt the wild boar, have of late been called simply *hunters*.

In hunting, they set out at day-break, preceded by the beagles, and followed by their servants with the rest of the dogs; and as they made it a point never to balk their beagles, they were often led by them over the most frightful precipices, and through places which any other mortal would have deemed absolutely impassable. As soon as the beagles had roused the game, the rest of the dogs struck up and surrounded the beast, stopping it, and keeping a constant barking till the bucaneer could get near enough to shoot it; in doing this, he commonly aimed at the pit of the breast; when the beast fell, he hamstringed it, to prevent its rising again. But it has sometimes happened that the creature, not wounded enough to tumble to the ground, has run furiously at his pursuer, and ripped him open. But, in general, the bucaneer seldom missed his aim; and when he did, was nimble enough to get up the tree behind which he had the precaution to place himself. What is more; some of them have been seen to overtake the beast in chace, and hamstring it without any further ceremony.

As soon as the prey was half skinned, the master cut out a large bone, and sucked the marrow for breakfast. The rest he left to his servants, one of whom always remained behind to finish the skinning, and bring the skin with a choice piece of meat for the huntsmen's dinner. They then continued the chace till they had killed as many beasts as there were heads in the company. The master was the last to return to the boucan, loaded like the rest with a skin and a piece of meat. Here the bucanneers found their tables ready: for every one had his separate table; which was the first thing, any way fit for the purpose, that came in their way, a stone, the trunk of a tree, and the like. No table-cloth, no napkin, no bread or wine, graced their board; not even potatoes or bananas, unless they found them ready to their hands. When this did not happen, the fat and lean of the game, taken alternately, served to supply the place. A little pimento, and the squeeze of an orange, their only sauce; contentment, peace of mind, a good appetite, and abundance of mirth, made every thing agreeable. Thus they lived and spent their time, till they had completed the number of hides for which they had agreed with the merchants; which done, they carried them to Tortuga, or some port of the great island.

As the bucanneers used much exercise, and fed only on flesh meat, they generally enjoyed a good state of health. They were indeed subject to fevers, but either such as lasted only a day, and left no sensible impression the day following; or little slow fevers, which did not hinder them from action, and were of course so little regarded, that it was usual with the patient, when asked how he did, to answer, "Very well, nothing ails me but the fever." It was impossible, however, they should not suffer considerably by such fatigues under a climate, to the heat of which few of them had been early enough inured. Hence the most considerate among them, after they had got money enough for that purpose, turned planters. The rest soon spent the

fruits of their labour in taverns and tippling-houses; and many had so habituated themselves to this kind of life, as to become incapable of any other. Nay, there have been instances of young men, who having early embarked through necessity in this painful and dangerous profession, perished in it afterwards, merely thro' a principle of libertinism, rather than return to France and take possession of the most plentiful fortunes.

Such were the bucanneers of St Domingo, and such their situation, when the Spaniards undertook to extirpate them. And at first they met with great success; for as the bucanneers hunted separately, every one attended by his servants, they were easily surprised. Hence the Spaniards killed numbers, and took many more, whom they condemned to a most cruel slavery. But whenever the bucanneers had time to put themselves into a state of defence, they fought like lions, to avoid falling into the hands of a nation from whom they were sure to receive no quarter; and by this means they often escaped; nay, there are many instances of single men fighting their way through numbers. These dangers, however, and the success of the Spaniards in discovering their boucans, where they used to surprise and cut the throats of them and their servants in their sleep, engaged them to colabrit in greater numbers, and even to act offensively, in hopes that by so doing they might at last induce the Spaniards to let them live in peace. But the fury with which they behaved whenever they met any Spaniards, served only to make their enemies more intent on their destruction; and assistance coming to both parties, the whole island was turned into a slaughter-house, and so much blood spilt on both sides, that many places, on account of the carnage of which they had been the theatres, were intitled, *of the massacre*: such as *the hill of the massacre*; *the plain of the massacre*; *the valley of the massacre*; which names they retain to this day.

At length the Spaniards grew tired of this way of proceeding, and had recourse to their old method of surprise, which against enemies of more courage than vigilance was like to succeed better. This put the bucanneers under a necessity of never hunting but in large parties, and fixing their boucans in the little islands on the coast, where they retired every evening. This expedient succeeded; and the boucans, by being more fixed, soon acquired the air and consistency of little towns.

When the bucanneers had once fixed themselves, as related, each boucan ordered scouts every morning to the highest part of the island, in order to reconnoitre the coast, and see if any Spanish parties were abroad. If no enemy appeared, they appointed a place and hour of rendezvous in the evening, and were never absent if not killed or prisoners. When therefore any one of the company was missing, it was not lawful for the rest to hunt again till they had got intelligence of him if taken, or avenged his death if killed.

Things continued in this situation for a long time, till the Spaniards made a general hunt over the whole island; and by destroying their game, put the bucanneers under a necessity of betaking themselves to another course of life. Some of them turned planters; and thereby increased some of the French settlements on the coast, and formed others. The rest, not relishing to be confined and regular a life, entered among the freebooters, who thereby became a very powerful body.

France,

Bucaneer.

Buccaners.

Buccaners.

France, who had hitherto disclaimed for her subjects these ruffians whose successes were only temporary, acknowledged them, however, as soon as they formed themselves into settlements; and took proper measures for their government and defence *.

The hunting both of the bull and boar is at this day carried on, and proves of considerable importance. That of the former furnishes France with the finest hides brought from America. The buccaners put the hides in packs which they call loads, mixing together hides of full grown bulls, of young bullocks, and of cows. Each of these loads is composed of two bull-hides, or of *aa* equivalent; that is to say, either of two real bull-hides, or of one bull-hide and two cow-hides, or of four cow-hides, or of three young bullocks hides; three bullocks hides being reckoned equivalent to two full-grown bulls hides, and two cows hides equivalent to one bull's hide. These bulls they commonly call *oxen* in France, though they be not gelt. Each load is commonly fold for six pieces of eight rials, which is a Spanish coin, the French coin being but little current, or not at all, in the island of St Domingo.

The boar meat buccanned in the manner abovementioned is sold by the bundle or pack, weighing commonly 60 pounds, at the rate of six pieces of eight per pack. The palmetto leaves serve to pack it up in; but their weight is deducted, so that there must be in each pack 60 pounds of net flesh. These buccaners have also a great trade of the lard of boars, which they melt, and gather in large pots called *potiches*. This lard, which is called *mantegua*, is also sold for about eight pieces of eight per pot. There is a great trade, and a great consumption of each of these merchandizes in the French settlements of the island of St Domingo, and in those of Tortuga: besides which, they used to send great quantities of them to the Antilles, and even to the continent of French America. There is also a great deal of it sold for the support of the crews of the ships that come from France for trading, or which the privateers of Tortuga fit out for cruising against the Spaniards.

The Spaniards, who have large settlements in the island of St Domingo, have also their buccaners there, whom they call *matadores* or *monteros*. Their chase has something noble, which favours of the Spanish pride: the huntsman being on horseback, uses the lance to strike the bull, thinking it beneath his courage to shoot him at a distance. When the servants, who are on foot, have discovered the beast, and with their dogs have driven it into some savannah or meadow, in which the master waits for them on horseback, armed with two lances, that matadore goes and hamstringing it with the first lance, the head of which is made like a crescent or half-moon, and extremely sharp, and kills it afterwards with the other lance, which is a common one. This chase is very agreeable; the huntsman making commonly, in order to attack the bull, the same turns and the same ceremonies which are practised in those festivals so famous in Spain, wherein the greatest lords expose themselves sometimes to the view of the people, to make them admire their dexterity and intrepidity, in attacking those furious animals: but then it is a very dangerous chase; those bulls, in their fury, often running directly against the huntsman, who may think

himself very happy if he comes off only with the loss of his horse, and if he himself is not mortally wounded.

The Spaniards dress their hides like the French, who have learned it from them; and these hides being carried to the Havannah, a famous harbour in the island of Cuba, are part of the trade of that celebrated town. The flota and the galleons scarce ever fail touching there, on their return from Vera Cruz and Porto Bello, and load there those hides which they carry into Spain, where they are sold for Havannah hides, the most esteemed of any that are brought from America into Europe.

II. *BUCANERS, the Pirates.* Before the English had made any settlement at Jamaica, and the French at St Domingo, some pirates of both nations, who have since been so much distinguished by the name of *Buccaners*, had driven the Spaniards out of the small island of Tortuga; and, fortifying themselves there, had with an amazing intrepidity made excursions against the common enemy. They formed themselves into small companies, consisting of 50, 100, or 150 men each. A boat, of a greater or smaller size, was their only armament. Here they were exposed, night and day to all the inclemencies of the weather, having scarce room enough to lie down. A love of absolute independence, the greatest blessing to those who are not proprietors of land, rendered them averse from those mutual restraints which the members of society impose upon themselves for the common good; some of them chose to sing, while others were desirous of going to sleep. As the authority they had conferred on their captain was confined to his giving orders in battle, they lived in the greatest confusion. Like the savages, having no apprehension of want, nor any care to preserve the necessaries of life, they were constantly exposed to the severest extremities of hunger and thirst. But deriving, even from their very distresses, a courage superior to every danger, the sight of a ship transported them to a degree of frenzy. They never deliberated on the attack, but it was their custom to board the ship as soon as possible. The smallness of their vessels, and the skill they shewed in the management of them, screened them from the fire of the greater ships; and they presented only the fore part of their little vessels filled with fusiliers; who fired at the port-holes with so much exactness, that it entirely confounded the most experienced gunners. As soon as they threw out the grapplings, the largest vessel seldom escaped them.

In cases of extreme necessity, they attacked the people of every nation, but fell upon the Spaniards at all times. They thought that the cruelties the latter had exercised on the inhabitants of the new world justified the implacable aversion they had sworn against them. But this was heightened by a personal pique, from the mortification they felt in seeing themselves debarred from the privilege of hunting and fishing, which they considered as natural rights. Such were their principles of justice and religion, that, whenever they embarked on any expedition, they used to pray to heaven for the success of it; and they never came back from the plunder, but they constantly returned thanks to God for their victory.

The ships that sailed from Europe into America seldom tempted their avidity. The merchandise they contained would not easily have been sold, nor been very profitable to these barbarians in those early times. They al-

* See the article St Domingo.

See the article St Domingo.

See the article St Domingo.

Bucaneers.

Bucaneers.

ways waited for them on their return, when they were certain that they were laden with gold, silver, jewels, and all the valuable productions of the new world. If they met with a single ship, they never failed to attack her. As to the fleets, they followed them, till they failed out of the gulph of Bahama; and as soon as any one of the vessels was separated by accident from the rest, it was taken. The Spaniards, who trembled at the approach of the bucaners, whom they called *devils*, immediately surrendered. Quarter was granted, if the cargo proved to be a rich one; if not, all the prisoners were thrown into the sea.

The bucaners, when they had got a considerable booty, at first held their rendezvous at the island of Tortuga, in order to divide the spoil; but afterwards the French went to St Domingo, and the English to Jamaica. Each person, holding up his hand, solemnly protested that he had ferreted nothing of what he had taken. If any one among them was convicted of perjury, a case that seldom happened, he was left, as soon as an opportunity offered, upon some desert island, as a traitor unworthy to live in society. Such brave men among them as had been maimed in any of their expeditions, were first provided for. If they had lost a hand, an arm, a leg, or a foot, they received 26*l*. An eye, a finger, or a toe, lost in fight, was valued only at half the above sum. The wounded were allowed 2*s*. 6*d*. a-day for two months, to enable them to have their wounds taken care of. If they had not money enough to answer these several demands, the whole company were obliged to engage in some fresh expedition, and to continue it till they had acquired a sufficient stock to enable them to satisfy such honourable contracts.

After this act of justice and humanity, the remainder of the booty was divided into as many shares as there were bucaners. The commander could only lay claim to a single share as the rest; but they complimented him with two or three, in proportion as he had acquitted himself to their satisfaction. Favour never had any influence in the division of the booty; for every share was determined by lot. Instances of such rigid justice as this are not easily met with; and they extended even to the dead. Their share was given to the man who was known to be their companion when alive, and therefore their heir. If the person who had been killed had no intimate, his part was sent to his relations when they were known. If there were no friends or relations, it was distributed in charity to the poor and to churches, which were to pray for the person in whose name these benefactions were given.

When these duties had been complied with, they then indulged themselves in all kinds of profusion. Unbounded licentiousness in gaming, wine, women, every kind of debauchery, was carried to the utmost pitch of excess, and was stopt only by the want which such profusions brought on. Those men who were enriched with several millions, were in an instant totally ruined, and destitute of clothes and provisions. They returned to sea; and the new supplies they acquired were soon lavished in the same manner.

The Spanish colonies, flattering themselves with the hopes of seeing an end to their miseries, and reduced almost to despair in finding themselves a perpetual prey to these ruffians, grew weary of navigation. They gave up all the power, conveniences, and fortune, which

their connections procured them, and formed themselves almost into so many distinct and separate states. They were sensible of the inconveniences arising from such a conduct, and avowed them; but the dread of falling into the hands of rapacious and savage men, had greater influence over them, than the dictates of honour, interest, and policy. This was the life of that spirit of inactivity which continues to this time.

This dependancy served only to increase the boldness of the bucaners. As yet they had only appeared in the Spanish settlements, in order to carry off some provisions when they were in want of them. They no sooner found their captures begin to diminish, than they determined to recover by land what they had lost at sea. The richest and most populous countries of the continent were plundered and laid waste. The culture of lands was equally neglected with navigation; and the Spaniards dared no more appear in their public roads, than fail in the latitudes which belonged to them.

Among the bucaners who signalized themselves in this new species of excursions, Montbar, a gentleman of Languedoc, particularly distinguished himself. Having by chance, in his infancy, met with a circumstantial account of the cruelties practised in the conquest of the new world, he conceived an aversion which he carried to a degree of frenzy against that nation which had committed such enormities. The enthusiasm this spirit of humanity worked him up to, was turned into a rage more cruel than that of religious fanaticism, to which so many victims had been sacrificed. The names of these unhappy sufferers seemed to rouse him and call upon him for vengeance. He had heard some account of the bucaners, who were said to be the most inveterate enemies to the Spanish name: he therefore embarked on board a ship, in order to join them.

In the passage, they met with a Spanish vessel; attacked it; and, as it was usual in those times, immediately boarded it. Montbar, with a sabre in his hand, fell upon the enemy; broke through them; and, hurrying twice from one end of the ship to the other, levelled every thing that opposed him. When he had compelled the enemy to surrender, leaving to his companions the happiness of dividing so rich a booty, he contented himself with the savage pleasure of contemplating the dead bodies of the Spaniards, lying in heaps together, against whom he had sworn a constant and deadly hatred.

Fresh opportunities soon occurred, that enabled him to exert this spirit of revenge, without extinguishing it. The ship he was in arrived at the coast of St Domingo; where the bucaners on land immediately applied to barter some provisions for brandy. As the articles they offered were of little value, they alleged in excuse, that their enemies had over-run the country, laid waste their settlements, and carried off all they could. "Why (replied Montbar) do you tamely suffer such insults?" "Neither do we (answered they in the same tone); the Spaniards have experienced what kind of men we are, and have therefore taken advantage of the time when we were engaged in hunting. But we are going to join some of our companions, who have been still more ill-treated than we; and then we shall have warm work." "If you approve of it (answered Montbar), I will head you, not as your commander, but as the fore-

Bucaners.

Bucaners.

foremost to expose myself to danger." The bucaners, perceiving from his appearance that he was such a man as they wanted, cheerfully accepted his offer. The same day they overtook the enemy, and Montbar attacked them with an impetuosity that astonished the bravest. Scarcely one Spaniard escaped the effects of his fury. The remaining part of his life was equally distinguished as on this day. The Spaniards suffered so much from him, both by land and at sea, that he acquired the name of the *Exterminator*.

His savage disposition, as well as that of the other bucaners who attended him, having obliged the Spaniards to confine themselves within their settlements, these free-booters resolved to attack them there. This new method of carrying on the war required superior forces, and their associations in consequence became more numerous. The first that was considerable, was formed by Lolonois, who derived his name from the sands of Olonea the place of his birth. From the abject state of a bondman, he had gradually raised himself to the command of two canoes, with 22 men. With these he was so successful, as to take a Spanish frigate on the coast of Cuba. He then repaired to the Port-au-Prince, in which were four ships, fitted out purposely to sail in pursuit of him. He took them, and threw all the crew into the sea, except one man, whom he saved, in order to send him with a letter to the governor of the Havannah, acquainting him with what he had done, and assuring him that he would treat in the same manner all the Spaniards that should fall into his hands, not excepting the governor himself, if he should be so fortunate as to take him. After this expedition, he ran his canoes and prize-ships aground, and sailed with his frigate only to the island of Tortuga.

Here he met with Michael de Balco, who had distinguished himself by having taken, even under the cannon of Porto-Bello, a Spanish ship estimated at 218,500*l.* and by other actions equally brave and daring. These two gave out, that they were going to embark together on an expedition equally glorious and profitable; in consequence of which they soon collected together 440 men. This body of men, the most numerous the bucaners had yet been able to muster, sailed to the bay of Venezuela, which runs up into the country for the space of 50 leagues. The fort that was built at the entrance of it for its defence, was taken; the cannon were nailed up; and the whole garrison, consisting of 250 men, put to death. They then reembarked; and came to Maracaybo, built on the western coast of the lake of the same name, at the distance of ten leagues from its mouth. This city, which had become flourishing and rich by its trade in skins, tobacco, and cocoa, was deserted. The inhabitants had retired with their effects to the other side of the bay. If the bucaners had not lost a fortnight in riot and debauch, they would have found at Gibraltar, near the extremity of the lake, every thing that the inhabitants had secreted to secure it from being plundered. On the contrary, they met with fortifications lately erected, which they had the useless satisfaction of making themselves masters of, at the expence of a great deal of blood; for the inhabitants had already removed at a distance the most valuable part of their property. Exasperated at this disappointment, they set fire to Gibraltar. Maracaybo would have shared the same fate, had it not been ran-

fomed. Besides the sum they received for its ransom, they also carried off with them all the crosses, pictures, and bells of the churches; intending, as they said, to build a chapel in the island of Tortuga, and to consecrate this part of their spoils to sacred purposes. Such was the religion of these barbarous people, who could make no other offering to heaven than that which arose from their robberies and plunder.

While they were idly dissipating the spoils they had made on the coast of Venezuela, Morgan, the most renowned of the English bucaners, sailed from Jamaica to attack Porto-Bello. His plan of operations was so well contrived, that he surprised the city, and took it without opposition.

The conquest of Panama was an object of much greater importance. To secure this, Morgan thought it necessary to sail in the latitudes of Costa-Rica, to procure some guides in the island of St Catherine's, where the Spaniards confined their malefactors. This place was so strongly fortified, that it ought to have held out for ten years against a considerable army. Notwithstanding this, the governor, on the first appearance of the pirates, sent privately to concert measures how he might surrender himself without incurring the imputation of cowardice. The result of this consultation was, that Morgan, in the night-time, should attack a fort at some distance, and the governor should fall out of the citadel to defend a post of so much consequence; that the assailants should then attack him in the rear, and take him prisoner, which would consequently occasion a surrender of the place. It was agreed that a smart firing should be kept on both sides, without doing mischief to either. This farce was admirably carried on. The Spaniards, without being exposed to any danger, appeared to have done their duty; and the bucaners, after having totally demolished the fortifications, and put on board their vessels a prodigious quantity of warlike ammunitions which they found at St Catherine's, steered their course towards the river Chagre, the only channel that was open to them to arrive at the place which was the object of their utmost wishes.

At the entrance of this considerable river, a fort was built upon a steep rock, which the waves of the sea constantly beat against. This bulwark, very difficult of access, was defended by an officer whose extraordinary abilities were equal to his courage, and by a garrison that deserved such a commander. The bucaners, for the first time, here met with a resistance that could only be equalled by their perseverance: it was a doubtful point, whether they would succeed, or be obliged to raise the siege, when a lucky accident happened that proved favourable to their glory and their fortune. The commander was killed, and the fort accidentally took fire: the besiegers then taking advantage of this double calamity, made themselves masters of the place.

Morgan left his vessels at anchor, with a sufficient number of men to guard them; and sailed up the river in his sloop for 33 miles, till he came to Cruces, where it ceases to be navigable. He then proceeded by land to Panama, which was only five leagues distant. Upon a large and extensive plain that was before the city, he met with a considerable body of troops, whom he put to flight with the greatest ease, and entered into the city, which was now abandoned. Here were found prodigious treasures concealed in the wells and caves.

Bucaneers. Some valuable commodities were also taken upon the boats that were left aground at low water; and in the neighbouring forests were also found several rich deposits.

Having burnt the city, they set sail with a great number of prisoners, who were ransomed a few days after; and came to the mouth of the Chagre with a prodigious booty.

In 1603, an expedition of the greatest consequence was formed by Van Horn, a native of Olend, but who had served all his life among the French. His intrepidity would never let him suffer the least signs of cowardice among those who associated with him. In the heat of an engagement, he went about his ship; successfully observed his men; and immediately killed those who shrunk at the sudden report of a pistol, gun, or cannon. This extraordinary discipline had made him become the terror of the coward, and the idol of the brave. In other respects, he readily shared with the men of spirit and bravery the immense riches that were acquired by so truly warlike a disposition. When he went upon these expeditions, he generally sailed in his frigate, which was his own property. But these new designs requiring greater numbers to carry them into execution, he took to his assistance Grammont, Godfrey, and Jonqué, three Frenchmen distinguished by their exploits; and Lawrence de Graff, a Dutchman, who had signalized himself still more than they. Twelve hundred bucaners joined themselves to these famous commanders, and sailed in six vessels for Vera Cruz.

The darkness of the night favoured their landing, which was effected at three leagues from the place, where they arrived without being discovered. The governor, the fort, the barracks, and the posts of the greatest consequence; every thing, in short, that could occasion any resistance, was taken by the break of day. All the citizens, men, women, and children, were shut up in the churches, whither they had fled for shelter. At the door of each church were placed barrels of gunpowder to blow up the building. A bucaner, with a lighted match, was to set fire to it upon the least appearance of an insurrection.

While the city was kept in such terror, it was easily pillaged; and after the bucaners had carried off what was most valuable, they made a proposal to the citizens who were kept prisoners in the churches, to ransom their lives and liberties by a contribution of 437,500*l*. These unfortunate people, who had neither ate nor drank for three days, cheerfully accepted the terms that were offered them. Half of the money was paid the same day: the other part was expected from the internal parts of the country; when there appeared on an eminence a considerable body of troops advancing, and near the port a fleet of 17 ships from Europe. At the sight of this armament, the bucaners, without any marks of surprise, retreated quietly, with 1500 slaves they had carried off with them as a trifling indemnification for the rest of the money they expected, the settling of which they referred to a more favourable opportunity.

Their retreat was equally daring. They boldly sailed through the midst of the Spanish fleet; which let them pass without firing a single gun, and were in fact rather afraid of being attacked and beaten. The Spaniards would not probably have escaped so easily, and with no other inconvenience but what arose from their fears,

if the vessels of the pirates had not been laden with silver, or if the Spanish fleet had been freighted with any other effects but such merchandise as were little valued by these pirates.

A year had scarce elapsed since their return from Mexico, when on a sudden they were all seized with the rage of going to plunder the country of Pern. It is probable, that the hope of finding greater treasures upon a sea little frequented, than on one long exposed to piracies of this kind, was the cause of this expedition. But it is somewhat remarkable, that both the English and French, and the particular associations of these two nations, had projected this plan at the same time, without any communication, intercourse, or design of acting in concert, with each other. About 4000 men were employed in this expedition. Some of them came by Terra-Firma, others by the freights of Magellan, to the place that was the object of their wishes. If the intrepidity of these barbarians had been directed, under the influence of a skilful and respectable commander, to one single uniform end, it is certain that they would have deprived the Spaniards of this important colony. But their natural character was an invincible obstacle to so rare an union; for they always formed themselves into several distinct bodies, sometimes even so few in number as ten or twelve, who acted together, or separated, as the most trifling caprice directed. Grogner, Lécuyer, Picard, and Le Sage, were the most distinguished officers among the French: David, Samms, Peter, Wilner, and Towley, among the English.

Such of those adventurers as had got into the South Sea by the freights of Darien, seized upon the first vessels they found upon the coast. Their associates, who had sailed in their own vessels, were not much better provided. Weak however as they were, they beat several times the squadrons that were fitted out against them. But these victories were prejudicial to them, as they interrupted their navigation. When there were no more ships to be taken, they were continually obliged to make descents upon the coasts to get provisions, or to go by land in order to plunder those cities where the booty was secured. They successively attacked Seppa, Puebla-Nuevo, Leon, Realajo, Puebla-Viejo, Chiriquita, Lefparso, Granada, Villia, Nicoya, Tecotaneca, Mucmeluna, Chiloteca, New-Segovia, and Guayaquil, the most considerable of all these places.

Many of them were taken by surprise; and most of them deserted by their inhabitants, who fled at the sight of the enemy. As soon as they took a town, it was directly set on fire, unless a sum proportioned to its value was given to save it. The prisoners taken in battle were massacred without mercy, if they were not ransomed by the governor or some of the inhabitants: gold, pearls, or precious stones, were the only things accepted of for the payment of their ransom. Silver being too common, and too weighty for its current value, would have been troublesome to them. The chances of fortune, that seldom leave guilt unpunished, nor adversity without a compensation for its suffering, atoned for the crimes committed in the conquest of the new world, and the Indians were amply revenged of the Spaniards.

While such piracies were committed on the southern ocean, the northern was threatened with the same by Gram-

Bucaneers.

Bucaneers.

Grammont. He was a native of Paris, by birth a gentleman, and had distinguished himself in a military capacity in Europe; but his passion for wine, gaming, and women, had obliged him to join the pirates. He was, however, affable, polite, generous, and eloquent; he was endued with a sound judgment, and was a person of approved valour; which soon made him be considered as the chief of the French bucanears. As soon as it was known that he had taken up arms, he was immediately joined by a number of brave men. The governor of St Domingo, who had at length prevailed upon his master to approve of the project, equally wise and just, of fixing the pirates to some place, and inducing them to become cultivators, was desirous of preventing the concerted expedition, and forbade it in the king's name. Grammont, who had a greater share of sense than his associates, was not on that account more inclined to comply, and sternly replied: "How can Lewis disapprove of a design he is unacquainted with, and which has been planned only a few days ago?" This answer highly pleased all the bucanears; who directly embarked, in 1685, to attack Campeachy.

They landed without opposition. But at some distance from the coast, they were attacked by 800 Spaniards, who were beaten and pursued to the town; where both parties entered at the same time. The cannon they found there was immediately levelled against the citadel. As it had very little effect, they were contriving some stratagem to enable them to become masters of the place; when intelligence was brought that it was abandoned. There remained in it only a gunner; an Englishman; and an officer of such signal courage, that he chose rather to expose himself to the greatest extremities, than basely to fly from the place with the rest. The commander of the bucanears received him with marks of distinction, generously released him, gave him up all his effects, and besides complimented him with some valuable presents: such influence have courage and fidelity even on the minds of those who seem to violate all the rights of society.

The conquerors of Campeachy spent two months in searching all the environs of the city, for 12 or 15 leagues, carrying off every thing that the inhabitants, in their flight, thought they had preserved. When all the treasure they had collected from every quarter was deposited in the ships, a proposal was made to the governor of the province, who still kept the field with 900 men, to ransom his capital city. His refusal determined them to burn it, and demolish the citadel. The French, on the festival of St Louis, were celebrating the anniversary of their king; and in the transports of their patriotism, intoxication, and national love of their prince, they burnt to the value of a million of logwood; a part, and a very considerable one too, of the spoil they had made. After this singular and extravagant instance of folly, of which Frenchmen only could boast, they returned to St Domingo.

In 1697, 1200 bucanears were induced to join a squadron of seven ships that sailed from Europe under the command of Pointis, to attack the famous city of Carthagena. This was the most difficult enterprise that could be attempted in the new world. The situation of the port, the strength of the place, the badness of the climate, were so many obstacles that seemed insurmountable to any but such men as the bucanears were.

Bucaneers,
Buccellarii.

But every obstacle yielded to their valour and good fortune: the city was taken, and booty gained to the amount of 1,750,000*l*. Their rapacious commander, however, deprived them of the advantages resulting from their success. He scrupled not, as soon as they set sail, to offer 5250*l*. for the share of those who had been the chief instruments in procuring him so considerable a spoil.

The bucanears, exasperated at this treatment, resolved immediately to board the vessel called the *Sceptre*, where Pointis himself was, and which at that time was too far distant from the rest of the ships to expect to be assisted by them. This avaricious commander was upon the point of being massacred, when one of the malecontents cried out: "Brethren, why should we attack this rascal? he has carried off nothing that belongs to us. He has left our share at Carthagena, and there we must go to recover it." This proposal was received with general applause. A savage joy at once succeeded that gloomy melancholy which had seized them; and without further deliberation, all their ships sailed towards the city.

As soon as they had entered the city without meeting with any resistance, they shut up all the men in the great church; and exacted payment of 218,750*l*. the amount of their share of booty which they had been defrauded of; promising to retreat immediately upon their compliance, but threatening the most dreadful vengeance if they refused. Upon this, the most venerable priest in the city mounted the pulpit, and made use of the influence his character, his authority, and his eloquence gave him, to persuade his hearers to yield up without reserve all the gold, silver, and jewels they had. The collection, which was made after the sermon, not furnishing the sum required, the city was ordered to be plundered.

At length, after amassing all they could, these adventurers set sail; when unfortunately they met with a fleet of Dutch and English ships, both which nations were then in alliance with Spain. Several of the pirates were either taken or sunk, with all the cargo they had on board their ships; the rest escaped to St Domingo.

Such was the last memorable event in the history of the bucanears. The separation of the English and French, when the war, on account of the prince of Orange, divided the two nations: the successful means they both made use of to promote the cultivation of land among their colonies, by the assistance of these enterprising men; and the prudence they shewed in fixing the most distinguished among them, and entrusting them with civil and military employments: the protection they were both under a necessity of affording to the Spanish settlements, which till then had been a general object of plunder: all these circumstances, and various others, besides the impossibility there was of supplying the place of these remarkable men, who were continually dropping off, concurred to put an end to a society, as extraordinary as ever existed. Without any regular system, without laws, without any degree of subordination, and even without any fixed revenue, they became the astonishment of that age in which they lived, as they will be also of posterity.

BUCELLARI, an order of soldiery under the Greek emperors, appointed to guard and distribute the

Buccellatum ammunition bread; tho' authors are somewhat divided as to their office and quality. Among the Visigoths, buccellarius was a general name for a client or vassal who lived at the expence of his lord. Some give the denomination to parasites in the courts of princes, some make them the body-guards of emperors, and some fancy they were only such as emperors employed in putting persons to death privately.

BUCELLATUM, among ancient military writers, denotes camp-bread, or biscuit baked hard and dry, both for lightness and keeping. Soldiers always carried with them enough for a fortnight, and sometimes much longer, during the time that military discipline was kept up.

BUCCINA, an ancient musical and military instrument. It is usually taken for a kind of trumpet; which opinion is confirmed by Festus, by his defining it a crooked horn, played on like a trumpet. Vegetius observes, that the buccina bent in a semicircle, in which respect it differed from the tuba or trumpet. It is very hard to distinguish it from the cornu or horn, unless it was something less, and not quite so crooked; yet it certainly was of a different species, because we never read of the cornu in use with the watch, but only the buccina. Besides, the sound of the buccina was sharper, and to be heard much farther, than either the cornu or the tuba. In scripture, the like instrument, used both in war and in the temple, was called *rams-horns*, *kiren-jobel*, and *sopheroth hagijobelim*.

This instrument was in use among the Jews to proclaim their feast-days, new-moons, jubilees, sabbatic years, and the like. At Lacedæmon, notice was given by the buccina, when it was supper-time; and the like was done at Rome, where the grandees had a buccina blown both before and after they sat down to table. The sound of the buccina was called *buccinus*, or *bucinus*; and the musician who played on it was called *buccinator*.

BUCCINUM, or **WHELK**, a genus of shell-fish belonging to the order of *vermes testaceæ*. This animal is one of the snail kind. The shell is univalve, spiral, and gibbous. The aperture is oval, ending in a small strait canal. Linnæus enumerates about 60 species, most of which are found in the southern seas. The six following are found in the British seas.

1. The *pullus*, or brown whelk, with five spires striated, waved, and tuberculated. Aperture wrinkled; upper part replicated. Length five eighths of an inch.
2. The *undatum*, or waved whelk, with seven spires, is spirally striated, and deeply and transversely undulated. Length three inches. Inhabits deep water.
3. The *striatum* has eight spires, with elevated striae, undulated near the apex. Length near four inches.
4. The *reticulatum*, with spires scarcely raised, and strongly reticulated, is of a deep brown colour, and of an oblong form. The aperture white, glossy, and denticulated. Size of a hazel nut.
5. The *minutum*, or small whelk, with five spires, striated spirally, ribbed transversely. Size less than a pea. Found also in Norway.

* PL. LXVI. fig. 1. 6. The *lapillus* *, or massy whelk, with about five spires; side of the mouth slightly toothed: a very strong thick shell, of a whitish colour. A variety yellow, or fasciated with yellow, on a white ground; or sulcated spirally, and sometimes reticulated. Length

near an inch and an half. Inhabits, in vast abundance, rocks near low-water mark. This is one of the British shells that produce the purple dye analogous to the *purpura* of the ancients. See *MUREX*.

The process of obtaining the English *purpura* is well described by Mr William Cole of Bristol, in 1684, in the following words. "The shells, being harder than most other kinds, are to be broken with a smart stroke of a hammer, on a plate of iron or firm piece of timber (with their mouths downwards)-so as not to crush the body of the fish within; the broken pieces being picked off, there will appear a white vein lying transversely in a little furrow or cleft next to the head of the fish, which must be digged out with the stiff point of a horse-hair pencil, being made short and tapering. The letters, figures, or what else shall be made on the linen, (and perhaps silk too), will presently appear of a pleasant light green colour; and if placed in the sun, will change into the following colours; (*i. e.* if in winter, about noon, if in the summer, an hour or two after sunrise, and so much before setting; for in the heat of the day in summer, the colours will come on so fast, that the succession of each colour will scarcely be distinguishable.) Next to the light green, it will appear of a deep green; and in a few minutes, change into a sea-green; after which, in a few minutes more, it will alter to a watchet-blue; from that, in a little time more, it will be of a purple-red; after which, (supposing the sun still shining), it will be of a very deep purple-red, beyond which the sun can do no more. But then, the last and most beautiful colour, after washing in scalding water and soap, will (the matter being again put into the wind or sun to dry) be of a fair bright crimson, or near to the prince's colour; which afterwards, notwithstanding there is no use of any styptic to bind the colour, will continue the same if well ordered; as I have found in handkerchiefs, that have been washed more than 40 times; only it will be somewhat allayed from what it was after the first washing. While the cloth so writ upon lies in the sun, it will yield a very strong and fetid smell, as if garlic and asafetida were mixed together."

BUCCO, in ornithology, a genus belonging to the order of *picæ*. The beak is cultrated, turned inwards, compressed on the sides, and emarginated on each side at the apex; and there is a long slit below the eyes. The nostrils are covered with feathers. The feet have four toes, two before and two behind. There is but one species, *viz.* the capensis, which is of a reddish colour, with a yellow belt round the shoulders, and a black one round the breast. It is found at the Cape of Good Hope.

BUCENTAUR, a galeas, or large galley of the doge of Venice, adorned with fine pillars on both sides, and gilt over from the prow to the stern. This vessel is covered over head with a kind of tent, made of purple silk. In it the doge receives the great lords and persons of quality that go to Venice, accompanied with the ambassadors and counsellors of state, and all the senators seated on benches by him. The same vessel serves also in the magnificent ceremony of ascension-day, on which the duke of Venice throws a ring into the sea to epouse it, and to denote his dominion over the gulph of Venice.

BUCENTAUR is also the name of a ship, as great and

Euccinum
Bucenaur.

Phil. Trans.
abr. ii. 526.

as magnificent as that of the Venetians, built by order of the elector of Bavaria, and lanchd on a lake which is six leagues in length.

BUCER (Martin), one of the first authors of the reformation at Straßburg, was born in 1491, in Alface; and took the religious habit of St Dominic, at seven years of age: but meeting afterward with the writings of Martin Luther, and comparing them with the Scriptures, he began to entertain doubts concerning several things in the Romish religion. After some conferences with Luther at Heidelberg in 1521, he adopted most of his sentiments; but in 1532 he gave the preference to those of Zuinglius. He assisted in many conferences concerning religion; and in 1548 was sent for to Augsburg to sign the agreement between the Papists and Protestants, called the *interim*. His warm opposition to this project exposed him to many difficulties and hardships; the news of which reaching England, where his fame had already arrived, Cranmer archbishop of Canterbury gave him an invitation to come over, which he readily accepted. In 1549, an handsome apartment was assigned him in the university of Cambridge, and a salary to teach theology. King Edward VI. had the greatest regard for him. Being told that he was very sensible of the cold of the climate, and suffered much for want of a German stove, he sent him 100 crowns to purchase one. He died of a complication of disorders in 1551; and was buried at Cambridge with great funeral pomp. Five years after, in the reign of queen Mary, his body was dug up, and publicly burnt, and his tomb demolished; but it was afterwards set up by order of queen Elizabeth. He composed many works, among which are commentaries on the evangelists and gospels.

BUCEROS, in ornithology, a genus belonging to the order of picæ. The beak is convex, cultrated, very large, and serrated outwards: the fore-head is naked, with a bony gibbosity. The nostrils are behind the base of the beak. The tongue is sharp and short. The feet are of the *gressarii* kind, i. e. the toes are distinct from each other. There are four species of the buceros, viz. 1. The *bicornis*, with a flat bony forehead, and two horns before. The body is black, and about the size of a hen; but the breast, belly, and thighs are white. There is a white spot on the wing; the tail is long, with ten black prime feathers, and the four outermost on each are white. The feet are greenish, with three toes before and one behind. It is a native of China, and called *calao* by Willoughby and other authors. 2. The *hydrocorax*, or Indian crow of Ray, has a plain bony forehead without any horns. The body is yellowish, and blackish below. It inhabits the Molucca isles. 3. The *rhinoceros*, has a crooked horn in the forehead joined to the upper mandible. It is a native of India, and feeds upon carrion. 4. The *nastutus*, has a smooth forehead. It is about the size of a magpye, and is a native of Senegal.

BUCHAN, a county or district of Scotland, lying partly in the shire of Aberdeen, and partly in that of Banff: it gives the title of earl to the noble and ancient family of Erskine.

BUCHANAN (George), the best Latin poet of his time, perhaps inferior to none since the Augustan age, was born in February 1506.

This accomplished scholar and distinguished wit was

not defended of a family remarkable for its rank. He had no occasion for the splendor of ancestry. He wanted not a reflected greatness, the equivocal, and too often the only, ornament of the rich and noble. The village of Killearn, in Dumbarton-shire, Scotland, was the place of his nativity; and the abject poverty in which his father died might have confined him to toil at the lowest employments of life, if the generosity of an uncle had not assisted him in his education, and enabled him to pursue, for two years, his studies at Paris. But that short space was scarcely elapsed, when the death of his benefactor made it necessary that he should return to his own country, and forsake, for a time, the paths of science.

He was yet under his 20th year, and surrounded with the horrors of indigence. In this extremity, he enlisted as a common soldier under John duke of Albany, who commanded the troops which France had sent to assist Scotland in the war it waged, at this period, against England. But nature had not destined him to be a hero. He was disgusted with the fatigues of one campaign; and, fortunately, John Major, then professor of philosophy at St Andrew's, hearing of his necessity and his merit, afforded him a temporary relief. He now became the pupil of John Maiz, a celebrated teacher in the same university, under whom he studied the subtilties of logic; and, contracting an attachment to his master, he followed him to Paris.

There, after having encountered many difficulties, he was invited to teach grammar in the college of St Barbe. In this slavish occupation he was found by the earl of Caesles, with whom, having remained five years at Paris, he returned into Scotland. He next acted as preceptor to the famous earl of Murray, the natural son of James V. But, while he was forming this nobleman for public affairs, he found that his life was in danger; and from enemies, whose vindictive rage could suffer no abatement, and who would not scruple the most dishonourable means of gratifying it.

The scandalous lives of the clergy had, it seems, excited his indignation; and, more than reasoning or argument, had estranged him from the errors of Popery. The Franciscan monks, in return to the beautiful but poignant satires he had written against them, branded him with the appellation of *atheist*; a term which the religious of all denominations are too apt indiscriminately to lavish where they have conceived a prejudice; and, not satisfied with the outrage of abuse and calumny, they conspired his destruction. Cardinal Beaton gave orders to apprehend him, and bribed king James with a very considerable sum to permit his execution. He was seized upon accordingly; and the first genius of his age was about to perish by the halter, or by fire, to satisfy a malignant resentment, when, escaping the vigilance of his guards, he fled into England. Henry VIII. at all times the slave of caprice and passion, was then burning, on the same day, and at the same stake, the Lutheran and the Papist. His court did not suit a philosopher, or a satyrist. After a short stay, Buchanan crossed the sea to France; and, to his extreme disappointment, found, at Paris, cardinal Beaton, as ambassador from Scotland. He retired privately to Bourdeaux, dreading, perhaps, new misfortunes, and concerned that he could not prosecute his studies in obscurity and in silence. Here he met Andrew Govea,

Buchanan.

Govea, a Portuguese of great learning and worth, with whom he had formerly been acquainted during his travels, and who was now employed in teaching a public school. He disdained not to act as the assistant of his friend; and, during the three years he resided at this place, he composed the tragedies which do him so much honour. It was here, also, that he wrote some of the most pleasant of those poems, in which he has rallied the muses, and threatened to forsake them, as not being able to maintain their votary. About this time, too, he presented a copy of verses to the emperor Charles V. who happened to pass through Bourdeaux.

His enemies, mean while, were not inactive. Cardinal Beaton wrote about him to the archbishop of Bourdeaux; and, by every motive which a cunning and a wicked heart can invent, he invited him to punish the most pestilential of all heretics. The archbishop, however, was not so violent as the cardinal. On inquiring into the matter, he was convinced that the poet had committed a very small impropriety; and allowed him to be pacified.

But fortune was not long to continue her smiles. Andrew Govea being called by the king of Portugal, his master, to establish an academy at Coimbra, he invited Buchanan to accompany him. He obtained his request; and had not been a year in his own country, when he died, and left his associate exposed to the malice of his inveterate enemies the monks. They loudly objected to him, that he was a Lutheran; that he had written poems against the Franciscans; and that he had been guilty of the abominable crime of eating flesh in lent. He was confined to a monastery till he should learn what these men fancied to be religion; and they enjoined him to translate the Psalms of David into Latin verse; a task which every man of taste knows with what admirable skill and genius he performed.

On obtaining his liberty, he had the offer of a speedy promotion from the king of Portugal; the issue of which, his aversion to the clergy did not allow him to wait. He hastened to England; but the perturbed state of affairs during the minority of Edward VI. not giving him the promise of any lasting security, he set out for France. There he had not been long, when he published his *Jephtha*, which his necessities made him dedicate to the marshal de Brissac. This patron did not want generosity, and could judge of merit. He sent him to Piedmont, as preceptor to his son Timoleon de Coffi.

In this employ he continued several years; and, during the leisure it afforded him, he fully examined the controversies which now agitated Europe; and he put the last hand to many of the most admired of his smaller poems.

When his pupil had no longer any use for him, he passed into Scotland, and made an open profession of the reformed faith. But he soon quitted his native country for France; which appears to have been more agreeable to his taste. Queen Mary, however, having determined that he should have the charge of educating her son, recalled him; and, till the prince should arrive at a proper age, he was nominated to the principality of St Andrew's. His success as James's preceptor is well known. When it was reproached to him, that he had made his majesty a pedant; "It is

a wonder (he replied) that I have made so much of him." Mackenzie relates a story concerning his tutelage of his pedantic majesty, which is strongly expressive of Buchanan's character as a man of humour, and, at the same time, shews the degree of his veneration for royalty. The young king being one day at play with his fellow-pupil the master of Erskine, Buchanan, who was then reading, desired them to make less noise. Finding that they disregarded his admonition, he told his majesty, if he did not hold his tongue, he would certainly whip his breech. The king replied, he would be glad to see who would *bell the cat*, alluding to the fable. Buchanan, in a passion, threw the book from him, and gave his majesty a sound flogging. The old counsellors of Mar, who was in the next apartment, rushed into the room, and, taking the king in her arms, rushed how he dared to lay his hand on *the Lord's anointed*. "Madam, (says Buchanan), I have whipped his a—; you may kiss it, if you please."

On the misfortunes which befel the amiable but imprudent Mary, he went over to the party of the earl of Murray; and at his earnest desire he was prevailed upon to write his "Detection," a work which his greatest admirers have read with regret. Having been sent with other commissioners to England, against his mistress, he was, on his return, rewarded with the abbacy of Crois Raguel; made director to the chancery; and, some time after, lord of the privy council, and privy seal. He was likewise rewarded by queen Elizabeth with a pension of 100 l. a-year. The twelve last years of his life he employed in composing his history of Scotland. After having vied with almost all the more eminent of the Latin poets, he contested with Livy and Sallust the palm of eloquence and political sagacity. But it is to be remembered with pain, that, like the former of these historians, he was not always careful to preserve himself from the charge of partiality. In the year 1582, he expired at Edinburgh, in the 76th year of his age.

Various writers who have mentioned this author, speak of him in very different language, according to their religious and political principles. From his works, however, it is evident, that, both as a Latin poet and prose writer, he hath rarely been equalled since the reign of Augustus; nor is he less deserving of remembrance as a friend to the natural liberties of mankind, in opposition to usurpation and tyranny. "The happy genius of Buchanan (says Dr Robertson), equally formed to excel in prose and in verse, more various, more original, and more elegant, than that of almost any other modern who writes in Latin, reflects, with regard to this particular, the greatest lustre on his country."

The following is a list of his works. 1. *Rerum Scoticarum*, &c. 2. *Psalmorum Davidis paraphrasis poetica*. 3. *De jure regni apud Scotos dialogus*. 4. *Psalmus civ. cum judicio Barclaii*, &c. 5. *Psalmus cxx. cum analysi organica Beuzeri*. 6. *Baptistes, sive calumnia*. 7. *Alexis, tragedia*. 8. *Tragedia sacra, et externa*. 9. *De caelesto recepto carmen*, apud Stephan. 10. *Franciscanus et fratres*, &c. 11. *Elegie, Sylve*, &c. 12. *De sphaera Herborne*. 13. *Poemata*. 14. *Satyra in cardinale Lotharingum*. 15. *Rudimenta grammatices, Tho. Linacri ex Anglico sermone in Latinum versa*. 16. An admonition to the true lords.

Buchanan.

Buchanness *17. De profundis. 18. Chameleon, 1572. 19. Ad viros sui seculi epistola. 20. Litera reginae Scotiae ad com. Bothwellie. 21. A detection of the doings of Mary queen of Scots, and of James earl of Bothwell, against Henry lord Darnly. 22. Vita ab ipso scripta, biniennio ante mortem, cum commentario D. Rob. Sibbaldi, M. D. 23. Life of Mary queen of Scots. These have been severally printed often, and in various countries. An edition of them all collected together was printed at Edinburgh in 1704, in 2 vols folio.*

Buckingham
||
Buckle.

* **BUCHANNESS**, a cape or promontory of Scotland, which is the farthest point of Buchan, not far from Peterhead, and the most eastern of all Scotland. E. Long. o. 30. N. Lat. 57. 28.

BUCHAW, a free and imperial town of Germany, in Suabia, seated on the river Tederfee, 22 miles south-west of Ulm. Here is a monastery, whose abbess has a voice in the diets of the empire. E. Long. 9. 37. N. Lat. 48. 5.

BUCHAW, a small territory of Germany, in the circle of the Upper Rhine, which comprehends the district of the abbot of Fland.

BUCHOREST, a pretty large town of Turkey, in Europe, seated in the middle of Walachia, and the ordinary residence of a hospodar. The houses are mean and very ill built, except a few that belong to the principal persons. In 1716, a party of Germans sent from Transylvania entered this town, and took the prince prisoner with all his court, and carried them off. This expedition was the more easily performed, as several lords of the country had a secret intelligence with the governor of Transylvania. This prince had no other way to regain his liberty, but by giving up that part of Walachia which lies between the river Aluth and Transylvania, to the emperor of Germany, by the peace concluded at Passarowitz in 1718. The Germans entered again into the capital of his dominions, and levied excessive contributions. But affairs took another turn after the fatal battle of Crotzka, in 1737; for the emperor was obliged to restore this part of Walachia to the hospodar, in virtue of the treaty of Belgrade. E. Long. 26. 30. N. Lat. 44. 30.

BUCHOM, a small, free, and imperial town of Swabia in Germany, seated on the lake of Constance, in E. Long. 9. 20. N. Lat. 47. 41.

BUCIOCHE, in commerce, a sort of woollen cloth manufactured in Provence in France, which the French ships carry to Alexandria and Cairo.

BUCK, in zoology, a male horned beast of venery or chase, whose female is denominated a doe *.

* See Cervus, and Buck-Hunting.

BUCK, is also applied to the males of the hare and rabbit kind. See **LEPUS**, and **HARE-HUNTING**.

Buck-Bean, in botany. See **MENYANTHES**.

Buck-Thorn, the English name of the **RHAMNUS**.

Buck-Wheat. See **POLYGONUM**.

BUCKENHAM (New), a town of Norfolk in England, which formerly had a strong castle, but now demolished. It is seated in a flat, in E. Long. 1. 10. N. Lat. 52. 30.

BUCKET, a small portable vessel to hold water, often made of leather for its lightness and easy use in cases of fire.—It is also the vessel let down into a well, or the sides of ships, to fetch up water.

BUCKING, the first operation in the whitening of linen yarn or cloth. See **BLEACHING**.

VOL. II.

BUCKINGHAM, the chief town of Buckinghamshire in England, stands in a low ground, on the river Ouse, by which it is almost surrounded, and over which there are three handsome stone-bridges. The town is large and populous, sends two members to parliament, and had the title of a duchy. It seems, however, to have been but an inconsiderable place at the conquest; for, according to Doomday-book, it paid only for one hide, and had but 26 burgesses. Edward the elder fortified it in the year 918 against the incursions of the Danes, with a rampart and turrets. It also had formerly a castle in the middle of the town, of which no vestiges now remain. The shrine of St Rumbald, the patron of fishermen, preserved in the church, was held in great veneration. The county-goal stands in this town, and here the assizes are sometimes kept. It was formerly a staple for wool, but that advantage it hath now lost. It is governed by a bailiff and 12 burgesses, who are the sole electors of the members. In its neighbourhood are many paper-mills upon the Ouse. W. Long. o. 58. N. Lat. 51. 30.

BUCKINGHAM-SHIRE, (supposed to derive its name from the Saxon word *Buc*, denoting a hart or buck), a county of England, bounded on the south by Berkshire, from which it is parted by the Thames; on the west by Oxfordshire; on the north by Northamptonshire; and on the east by Bedfordshire, Hertfordshire, and Middlesex. Its length is 39 miles, its breadth 18, and circumference 138; in which space it contains 441,000 acres; eight hundreds, three to the fourth, and five to the north of the Cheltem; 11 market-towns, six parliamentary boroughs, 185 parishes, and about 111,000 souls. The boroughs are, Buckingham, Chipping-Wycomb, Aylebury, Agmondesham, Wendover, and great Marlow, each of which sends two members to parliament, and the county two; in all 14. It lies in the diocese of Lincoln, and Norfolk circuit; and gives the title of earl to the family of Hobart.—The air is good, especially upon the Chiltem; and though in the vale it may not be altogether so pure and serene as upon the hills, the soil is more fruitful; yet that of the Chiltem is far from being barren; for, besides feeding large flocks of sheep, it produces very good wheat and barley. The meadows of the vale are among the richest pastures in England, as the sheep are among the largest; though the mutton is not so good as that of the downs, nor the beef equal to that of Somersetshire. The Chiltem was formerly over-run with wood, and infamous for being a harbour of thieves; but it hath long been cleared of both. The graziers of the vale are as considerable as any in England; and their herds of cattle as numerous, and of as large a size. The country is also well furnished with wood and water, so that it is inferior to few in England. The chief manufactures are paper and bone-lace; the last of which is almost equal to that of Flanders. The chief rivers are the Thames, the Ouse, and the Calm.

BUCKINGHAM (George Villiers duke of). See **VILLIERS**.

BUCKINGHAM (John Sheffield duke of). See **SHEFFIELD**.

BUCKLE, a well known utensil, made of divers sorts of metals, as gold, silver, steel, brass, &c.

The fashion or form of buckles is various; but their use, in general, is to make fast certain parts of dress,

Buckle
||
Buckram.

as the shoes, garters, &c.

BUCKLE, in heraldry. The buckle was so much esteemed in former times, that few persons of repute and honour wore their girdle without it; and it may be considered, in coats of arms, as a token of the surety, the faith, and service of the bearer.

BUCKLER, a piece of defensive armour used by the ancients. It was worn on the left arm; and composed of wickers woven together, or wood of the lightest sort, covered with hides, and fortified with plates of brass or other metal. The figure was sometimes round, sometimes oval, and sometimes almost square. Most of the bucklers were curiously adorned with all sorts of figures of birds and beasts, as eagles, lions; nor of these only, but of the gods, of the celestial bodies, and all the works of nature; which custom was derived from the heroic times, and from them communicated to the Grecians, Romans, and Barbarians.

The scutum, or Roman buckler, was of wood, the parts being joined together with little plates of iron, and the whole covered with a bull's hide. An iron plate went about it without, to keep off blows; and another within, to hinder it from taking any damage by lying on the ground. In the middle was an iron boss or *umbo* jutting out, very serviceable to glance off stones and darts; and sometimes to press violently upon the enemy, and drive all before them. They are to be distinguished from the clypei, which were less, and quite round, belonging more properly to other nations, though for some little time used by the Romans. The scuta themselves were of two kinds; the *ovata*, and the *imbricata*: the former is a plain oval figure; the other oblong, and bending inward like half a cylinder. Polybius makes the scuta four feet long, and Plutarch calls them *robore*, reaching down to the feet. And it is very probable that they covered almost the whole body, since in Livy we meet with soldiers who stood on the guard, sometimes sleeping with their head on their shield, having fixed the other part of it in the earth.

Votive BUCKLERS: Those consecrated to the gods, and hung up in their temples, either in commemoration of some hero, or as a thanksgiving for a victory obtained over an enemy; whose bucklers, taken in war, were offered as a trophy.

BUCKOR, a province of Asia, subject to the great mogul. It is seated on the river Indus, on the banks of which there are corn and cattle; but the west part, which is bounded by Sagestan in Persia, is a desert. The inhabitants are strong, robust, and apt to mutiny; for which reason the mogul has a garrison at the chief town, called *Buckor*, which is seated in an island made by the river Indus. They are all Mahometans, and drive a great trade in cotton cloth, and other Indian commodities. E. Long. 70. 5. N. Lat. 28. 10.

BUCKRAM, in commerce, a sort of coarse cloth made of hemp, gummed, calendered, and dyed several colours. It is put into those places of the lining of a garment, which one would have stiff, and to keep their form. It is also used in the bodies of womens gowns; and it often serves to make wrappers to cover cloths, ferges, and such other merchandises, in order to preserve them and keep them from the dust, and their colours from fading. Buckrams are sold wholesale by the dozen of small pieces or remnants, each

about four ells long, and broad according to the piece from which they are cut. Sometimes they use new pieces of linen cloth to make buckrams, but most commonly old sheets and old pieces of sails.

BUCKSTALL, a toil to take deer, which must not be kept by any body that has not a park of his own, under penalties.

BUCOLIC, in ancient poetry, a kind of poem relating to shepherds and country affairs, which, according to the most generally received opinion, took its rise in Sicily. Bucolics, says Vossius, have some conformity with comedy. Like it, they are pictures and imitations of ordinary life; with this difference, however, that comedy represents the manners of the inhabitants of cities, and bucolics the occupations of country people. Sometimes, continues he, this last poem is in form of a monologue, and sometimes of a dialogue. Sometimes there is action in it, and sometimes only narration; and sometimes it is composed both of action and narration. The hexameter verse is the most proper for bucolics in the Greek and Latin tongues. Moschus, Bion, Theocritus, and Virgil, are the most renowned of the ancient bucolic poets.

BUD, in botany. See the article *GEMMA*.

BUDA, the capital city of Hungary, called *Ofen* by the inhabitants, and *Buden* by the Turks. It is large, well fortified, and has a castle that is almost impregnable. The houses are tolerably handsome, being most of them built with square stone. It was a much finer place before the Turks had it in their possession; but they being masters of it 135 years, have suffered the finest buildings to fall to decay. The lower city, or Jews town, extends like suburbs from the upper city to the Danube. The upper town takes up all the declivity of a mountain; and is fortified with good walls, which have towers at certain distances. The castle, which is at the extremity of the hill, on the east side, and commands the greatest part of it, is surrounded with a very deep ditch, and defended by an old-fashioned tower, with the addition of new fortifications. There is also a suburb, inclosed with hedges, after the Hungarian manner. The most sumptuous structures now are the caravanseras, the mosques, bridges, and baths. These last are the finest in Europe, for the magnificence of the building, and plenty of water. Some of the springs are used for bathing and drinking; and others are so hot, that they cannot be used without a mixture of cold water. The Danube is about three quarters of a mile in breadth; and there is a bridge of boats between this city and Pest, consisting of 63 large pontoons. The Jews have a synagogue near the castle-gardens. The adjacent country is fruitful and pleasant, producing rich wines; though in some places they have a sulphureous flavour.

This city was the residence of the Hungarian monarchs till the Turks took it in 1526. Ferdinand archduke of Austria recovered it the next year; but in 1529 the Turks became masters of it again. In 1684 the Christians laid siege to it; but they were obliged to raise it soon after, though they had an army of 80,000 men. Two years after, the Turks lost it again, it being taken by assault in the fight of a very numerous army. The booty that the Christians found there was almost incredible, because the rich inhabitants had lodged their treasury in this city as a place of safety.

However,

Buck Stall
||
Buda.

Buda
||
Buddæus.

However, part of these riches were lost in the fire occasioned by the assault. This last siege cost the Christians a great deal of blood, because there were many in the camp who carried on a secret correspondence with the Turks. When the seraskier saw the city on fire, and found he could not relieve it, he beat his head against the ground for anger. In 1687, this city had like to have fallen into the hands of the Turks again, by treachery. After this, the Christians augmented the fortifications of this place, to which the Pope contributed 100,000 crowns, for this is looked upon as the key of Christendom. It is seated on the Danube, 105 miles south-east of Vienna, 163 north by west of Belgrade, and 563 north-west of Constantinople. E. Long. 19. 22. N. Lat. 47. 20.

BUDA (the beglerbeglic of), was one of the chief governments of the Turks in Europe. It included all the countries of Upper Hungary between the rivers Teisse and Danube, and between Agria and Novigrad all Lower Hungary, from Gran and Canica, the eastern part of Slavonia, and almost all Servia: but a good part of this government now belongs to the queen of Hungary.

BUDÆUS (William), the most learned man in France in the 15th century, was descended of an ancient and illustrious family, and born at Paris in 1467. He was placed young under masters; but barbarism prevailed so much in the schools of Paris, that Budæus took a dislike to them, and spent his whole time in idleness, till his parents sent him to the university of Orleans to study law. Here he passed three years without adding to his knowledge; for his parents sending for him back to Paris, found his ignorance no less than before, and his reluctance to study, and love to gaming and other youthful pleasures, much greater. They talked no more to him of learning of any kind; and as he was heir to a large fortune, left him to follow his own inclinations. He was passionately fond of hunting, and took great pleasure in horses, dogs, and hawks. The fire of youth beginning to cool, and his usual pleasures to pall upon his senses, he was seized with an irresistible passion for study. He immediately disposed of all his hunting equipage, and even abstracted himself from all business to apply himself wholly to study, in which he made, without any assistance, a very rapid and amazing progress, particularly in the Latin and Greek languages. The work which gained him greatest reputation was his treatise *de Affe*. His erudition and high birth were not his only advantages; he had an uncommon share of piety, modesty, gentleness, and good-breeding. The French king Francis I. often sent for him; and at his persuasion, and that of Du Bellay, founded the royal college of France, for teaching the languages and sciences. The king sent him to Rome with the character of his ambassador to Leo X. and in 1522 made him master of requests. The same year, he was chosen provost of the merchants. He died at Paris in 1540. His works, making four volumes in folio, were printed at Basil in 1557.

BUDDÆUS (John Francis), a celebrated Lutheran divine, and one of the most learned men Germany has produced, was born in 1667, at Anclam a town of Pomerania, where his father was minister. He was at first Greek and Latin professor at Colburg; af-

terwards professor of morality and politics in the university of Hall; and at length, in 1705, professor of divinity at Jena, where he fixed, and where he died, after having acquired a very great reputation. His principal works are, 1. A large historical German dictionary. 2. *Historia ecclesiastica Veteris Testamenti*, 2 vols 4^{to}. 3. *Elementa philosophiæ practicæ, instrumentalis et theoreticæ*, 3 vols 8vo. which has had a great number of editions, because, in most of the universities of Germany, the professors take this work for the text of their lessons. 4. *Selecta juris naturæ et gentium*. 5. *Miscellanea sacra*, 3 vols 4to. 6. *Isagoge historico-theologica ad theologiam universam, singulasque ejus partes*, 2 vols 4to; which is much valued by the Lutherans. 7. A treatise on atheism and superstition.

BUDDSDALE, or BETTISDALE, a town of Suffolk in England, seated in a dale or valley, and its street takes in a good part of Ricking, all which together make up the town, for of itself it is but a hamlet, having a small chapel, and an endowed grammar-school, to which belong certain scholarships, assigned to Bennet or Corpus Christi-college in Cambridge, being the gift of Sir Nicholas Bacon, lord keeper of the great seal. E. Long. 1. 8. N. Lat. 52. 25.

BUDDLE, in mineralogy, a large square frame of boards, used in washing the tin ore.

BUDDLEIA, in botany, a genus of the monogynia order, belonging to the tetrandria class of plants; of which there are two species, *viz.* the americana, and occidentalis. The first is a native of Jamaica and most of the other American islands; where it rises to the height of ten or twelve feet, with a thick woody stem covered with a grey bark; and sends out many branches towards the top, which come out opposite: at the ends of the branches the flowers are produced in long close spikes branching out in clusters, which are yellow, consisting of one leaf cut into four segments; these are succeeded by oblong capsules filled with small seeds. The second grows naturally at Carthage, and rises much higher than the other, dividing into a great number of slender branches covered with a russet hairy bark, garnished with long spear-shaped leaves ending in sharp points: at the end of the branches are produced branching spikes of white flowers growing in whorls round the stalks, with small spaces between each.—These plants grow in gullies, or other low sheltered spots; their branches being too tender to resist the force of strong winds. They may be propagated by seeds procured from those places where they are natives; and are to be managed like other exotics: only their seeds must be sown in pots as soon as they arrive, and very lightly covered; for if they are buried deep in the earth, they will all perish.

BUDELICH, a town of Germany, in the electoral circle of the Rhine and archbishopric of Treves, seated on the little river Traen, in E. Long. 6. 55. N. Lat. 49. 52.

BUDGE-BARRELS, among engineers, small barrels well hooped, with only one head; on the other end is nailed a piece of leather, to draw together upon strings like a purse. Their use is for carrying powder along with a gun or mortar; being less dangerous, and easier carried, than whole barrels. They are likewise used upon a battery of mortars, for holding meal-powder.

BUDGE (Eustace), Esq; an ingenious and polite

Buddesdale
||
Buddell.

Budgell. lite writer, was the son of Gilbert Budgell, doctor of divinity; and was born at St Thomas, near Exeter, about the year 1685. He was educated at Christ-church college, Oxford; from which he removed to the Inner Temple, London: but instead of studying the law, for which his father intended him, he applied to polite literature; kept company with the genteelst persons in town; and particularly contracted a strict intimacy with the ingenious Mr Addison, who was first cousin to his mother, and who, on his being made secretary to lord Wharton lord lieutenant of Ireland, took him with him as one of the clerks of his office. Mr Budgell, who was about 20 years of age, and had read the classics, and the works of the best English, French, and Italian authors, now became concerned with Sir Richard Steele and Mr Addison in writing the Tatler, as he had, soon after, a share in writing the Spectators, where all the papers written by him are marked with an X; and when that work was completed, he had likewise a hand in the Guardian, where his performances are marked with an asterisk. He was afterwards made under-secretary to Mr Addison, chief secretary to the lords justices of Ireland, and deputy-clerk of the council. Soon after, he was chosen member of the Irish parliament; and in 1717, Mr Addison, having become principal secretary of state in England, procured him the place of accountant and comptroller general of the revenue in Ireland. But the next year, the duke of Bolton being appointed lord-lieutenant, Mr Budgell wrote a lampoon against Mr Webster his secretary, in which his Grace himself was not spared; and upon all occasions treated that gentleman with the utmost contempt. This imprudent slip was the primary cause of his ruin: for the duke of Bolton, in support of his secretary, got him removed from the post of accountant-general; upon which, returning to England, he, contrary to the advice of Mr Addison, published his case in a pamphlet, intitled "A letter to the lord * * *, from Eustace Budgell, Esq; accountant-general," &c. Mr Addison had now resigned the seals, and was retired into the country for the sake of his health: Mr Budgell had also lost several other powerful friends, who had been taken off by death; particularly the lord Halifax, and the earl of Sunderland: he, however, made several attempts to succeed at court, but was constantly kept down by the duke of Bolton. In the year 1720 he lost 20,000*l.* by the South-sea scheme, and afterwards spent 5000*l.* more in unsuccessful attempts to get into parliament. This completed his ruin. He at length employed himself in writing pamphlets against the ministry, and wrote many papers in the Craftsman. In 1733, he began a weekly pamphlet, called *The Bee*; which he continued for above 100 numbers, printed in eight volumes 8vo. During the progress of this work, Dr Tindal's death happened, by whose will Mr Budgell had 2000*l.* left him; and the world being surprised at such a gift from a man entirely unrelated to him, to the exclusion of the next heir, a nephew and the continuator of Rapin's history of England, immediately imputed it to his making the will himself. Thus the satyrist:

Let Budgell charge low Grub-Street on my quill,
And write whatever he please, except my will.

It was thought he had some hand in publishing Dr Tindal's *Christianity as old as the creation*; for he often

talked of another additional volume on the same subject, but never published it. After the cessation of the Bee, Mr Budgell became so involved in law-suits, that he was reduced to a very unhappy situation. He got himself called to the bar, and attended for some time in the courts of law; but finding himself unable to make any progress, and being distressed to the utmost, he determined at length to make away with himself. Accordingly, in the year 1736, he took a boat at Somerset-hairs, after filling his pockets with stones; ordered the waterman to shoot the bridge; and, while the boat was going under, threw himself into the river. He had several days before been visibly distracted in his mind. Upon his bureau was found a slip of paper, on which were these words:

What Cato did, and Addison approv'd,
I cannot be wrong.

Besides the above works, he wrote a Translation of Theophrastus's Characters. He was never married; but left one natural daughter, who afterwards assumed his name, and became an actress in Drury-lane.

BUDOIA, a maritime town of Dalmatia, with a bishop's see, subject to the Venetians. It is seated between the gulf of Cattaro and the city of Duhigno, on the coast of Albany; and is an important fortress, where the Venetians always keep a strong garrison. In 1667, it suffered greatly by an earthquake: and in 1686 was besieged by Soliman basha of Scutari; but general Cornaro obliged him to raise the siege. E. Long. 19. 22. N. Lat. 42. 12.

BUDRIO, a town of Italy, in the Bolognese. The adjacent fields produce large quantities of fine hemp, which renders the town of more consequence than larger places. E. Long. 11. 35. N. Lat. 44. 27.

BUDWEIS, a royal city of Bohemia, in Germany. It is pretty large and well built, surrounded with strong walls, fortified with a good rampart, and might be made an important place. It was taken by the king of Prussia in 1744, but he did not keep it very long. E. Long. 14. 19. N. Lat. 42. 15.

BUDZIAC TARTARY, lies on the rivers Neistler, Bog, and Nieper; having Poland and Russia on the north, Little Tartary on the east, the Black sea on the south, and Bessarabia on the west. The chief town is Oczskow. It is subject to Turkey.

BUENA VISTA, one of the Cape de Verd islands, lying in N. Lat. 15. 56. It is also called *Bonvija*, and *Bonnevue*: but the first is the true appellation, the others being only abbreviations and corruptions of the original name, which signifies a *good prospect*, intimating the beautiful appearance it makes to ships at sea. This island is reckoned near 20 leagues in circumference, and is distinguished on the north side by a ridge of white rocks that bound it. The coast that stretches east and north-west is terminated with sundry banks to the sea; but the interior part is chiefly mountainous. From the northern point there is a large ridge of rocks projecting near a whole league into the sea, against which the waves break with incredible fury. Another point of rocks stretches into the sea on the southern point of the island eastward, a league and a half beyond that point; and in that bay is the best road for shipping.

BUENOS AYRES, a country of South America, belonging to the Spaniards. This name, given from the pleasantness of the climate, is extended to all that country

Budos
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Buenos.

Buenos
Buff.

try lying between Tucuman on the east, Paraguay on the north, and Terra Magellanica on the south, or to the vertex of that triangular point of land which comprises South America. The country is watered by the great river La Plata; first discovered in 1515 by Juan Diaz de Solis, who with two of his attendants was massacred by the natives; and partly subdued by Sebastian Gaboto, who gave the great river the appellation of *La Plata*, from the abundance of the precious metals he procured from the inhabitants, imagining them to be the produce of the country, though in fact they were brought from Peru.—No country in the world abounds more in horned cattle and horses than Buenos Ayres, where the greatest expence of a horse or cow is in the catching it, and they are frequently to be had at the small price of two or three rials. In such abundance are these useful animals, that the hide alone is deemed of any value, as this constitutes a main article in the trade of the country. All rove wild in the fields; but they are now become more difficult of access, the terrible havoc made among them having taught the cautious brutes to keep at a greater distance. All kinds of fish are in the same abundance; the fruits produced by every quarter of the globe grow up here in the utmost perfection; and for the enjoyment of life, and the salubrity of the air, a finer country cannot be imagined. The principal cities are Buenos Ayres the capital, Monte Video, Corrientes, and Santa Fe.

BUENOS-AYRES (Nuestra Señora de), the capital of the country called *Buenos Ayres*, in South America, was founded in the year 1535, under the direction of Don Pedro de Mendoza, at that time governor. It stands on a point called *Cape Blanco*, on the south side of the Plata, fronting a small river, in S. Lat. 34°. 34'. 38". according to the observations of Father Feuille. The situation is in a fine plain, rising by a gentle ascent from the river; and truly paradisaical, whether we regard the temperature of the climate, the fertility of the soil, or that beautiful verdure which overspreads the whole face of the country, of which the inhabitants have a prospect as far as the eye can reach. The city is very considerable in extent, containing 3000 houses, inhabited by Spaniards and others of different complexions. The streets are straight, broad, and pretty equal in the heights and dimensions of the buildings; one very handsome square adorns it, the front being a castle in which the governor holds his court, and presides over a garrison of 3000 soldiers. Most of the buildings are of chalk or brick, except the cathedral, a magnificent structure, composed chiefly of stone.

BUFALMACO (Boramico), an Italian painter; the first who put labels to the mouths of his figures, with sentences; since followed by bad masters, but more frequently in caricatura engravings. He died in 1340.

BUFF, in commerce, a sort of leather prepared from the skin of the buffalo; which dressed with oil, after the manner of shammy, makes what we call *buff-skin*. This makes a very considerable article in the French, English, and Dutch commerce at Constantinople, Smyrna, and all along the coast of Africa. The skins of elks, oxen, and other like animals, when prepared after the same manner as that of the buffalo, are likewise called *buffs*.

Of buff-skin, or buff-leather, are made a sort of coats for the horse or *gens d'armes* of France, bandaliers, belts,

pouches, and gloves.

In France, there are several manufactories designed for the dressing of those sorts of hides, particularly at Corbeil, near Paris; at Niort, at Lyons, at Rone, at Etanepus, at Cone.

BUFFALO, in zoology. See Bos.

BUFFET was anciently a little apartment, separated from the rest of the room by slender wooden columns, for the disposing of china, glass-ware, &c.

It is now properly a large table in a dining-room, called also a *side-board*, for the plate, glasses, bottles, basons, &c. to be placed on, as well for the service of the table, as for magnificence. In houses of persons of distinction in France, the buffet is a detached room, decorated with pictures relative to the subject, with fountains, cisterns, and vases. It is commonly faced with marble or bronze.

BUFFOON, a droll or mimic, who diverts the public by his pleasantries and follies.

BUFONIA, *TOAD-GRASS*; a genus of the monogynia order, belonging to the diandria class of plants, of which there is but one species, *viz.* the *tenuifolia*, a native of Britain.

BUG, or *BUGG*, in zoology, the English name of a species of cimex. See CIMEX.

Cheap, easy, and clean mixture for effectually destroying BUGS. Take of the highest rectified spirit of wine, (*viz.* lamp-spirits) that will burn all away dry, and leave not the least moisture behind it, half a pint; new distilled oil, or spirit of turpentine, half a pint: mix them together; and break into it, in small bits, half an ounce of camphire, which will dissolve in it in a few minutes: shake them well together; and with a piece of sponge, or a brush dipt in some of it, wet very well the bed or furniture wherein those vermin harbour and breed, and it will infallibly kill and destroy both them and their nits, although they swarm ever so much. But then the bed and furniture must be well and thoroughly wet with it (the dust upon them being first brushed and shook off), by which means it will neither soil, stain, nor in the least hurt, the finest silk or damask bed that is. The quantity here ordered of this mixture (that costs but about a shilling) will rid any one bed whatever, tho' it swarms with bugs. If any bugs should happen to appear after once using it, it will only be for want of well wetting the lacing, &c. of the bed, or the folding of the linens or curtains near the rings, or the joints or holes in and about the bed or head-board, wherein the bugs and nits nestle and breed; and then their being wetted all again with more of the same mixture, which dries in as fast as you use it, pouring some of it into the joints and holes where the brush or sponge cannot reach, will never fail absolutely to destroy them all. Some beds that have much wood work can hardly be thoroughly cleared without being first taken down; but others that can be drawn out, or that you can get well behind, to be done as it should be, may. The smell this mixture occasions will be all gone in two or three days; which yet is very wholesome, and to many people agreeable. Remember always to shake the mixture together very well, whenever you use it, which must be in the daytime, not by candle-light, lest the subtlety of the mixture should catch the flame as you are using it, and occasion damage.

BUGEY, a province of France, bounded on the east by

Buffalo
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Buggy.

Buggers
|
Bugia.

by Savoy, on the west by Bresse, on the south by Dauphiny, and on the north by the territory of Gex and the Franche Compté. It is about 40 miles long, and 25 broad. Though it is a country full of hills and rivers, yet it is fertile in some places, the rivers abound with trouts, and there are plenty of all sorts of game. The chief places are Belley the capital, Scisel, St Rambert, Fort l'Ecluse, and Chateau-Neuf.

BUGGERS, in church-history, the same with Bulgarians, a sect of heretics, which, among other errors, held, that men ought to believe no Scripture but the New Testament; that baptism was not necessary to infants; that husbands who conversed with their wives could not be saved; and that an oath was absolutely unlawful. The Buggers are mentioned by Matthew Paris, in the reign of Henry III. under the name of *Bugares*. They were strenuously refuted by Fr. Robert, a Dominican, furnished the *Bugger*, as having formerly made profession of this heresy.

BUGGERER, a person who is guilty of the crime of buggery. See the next article.

BUGGERY, or **SODOMY**, is defined by Sir Edward Coke to be a carnal copulation against nature, either by a confusion of species, that is to say, either a man or a woman with a brute beast; or sexes, as a man with a man, or a man unnaturally with a woman. It is said this sin against God and nature was first brought into England by the Lombards. As to its punishment, the voice of nature and of reason, and the express law of God †, determine it to be capital. Of this we have a signal instance, long before the Jewish dispensation, by the destruction of two cities by fire from heaven; so that this is an universal, not merely a provincial, precept. Our ancient law, in some measure, imitated this punishment, by commanding such miscreants to be burnt to death; though Fleta says, they should be buried alive; either of which punishments was indifferently used for this crime among the ancient Goths. But now the general punishment of all felonies is the same, namely, by hanging; and this offence (being in the times of Popery only subject to ecclesiastical censures) was made felony without benefit of clergy by statute 25 Hen. VIII. c. 6. revived and confirmed by 5 Eliz. c. 17. And the rule of law herein is, that, if both parties are arrived at the years of discretion, *agentes et consentientes pari pena plectantur*, "both are liable to the same punishment."

BUGIA, a province of the kingdom of Algiers in Africa. It is almost surrounded with mountains; and is divided into three parts, Benijubar, Auraz, and Lazbez. These mountains are peopled with the most ancient Arabs, Moors, or Saracens. The province is very fertile in corn.

BUGIA, by the Africans called *Bugeiah*, a maritime town of Africa, in the kingdom of Algiers, and once the capital of the province of that name. It is supposed to be the *Salda* of Strabo, built by the Romans. It hath a handsome port formed by a narrow neck of land running into the sea; a great part of whose promontory was formerly faced with a wall of hewn stone; where was likewise an aqueduct, which supplied the port with water, discharging it into a capacious basin; all which now lie in ruins. The city itself is built on the ruins of a large one, at the foot of a high mountain that looks towards the north-east; a great part of whose

walls run up quite to the top of it; where there is also a castle that commands the whole town, besides two others at the bottom, built for a security to the port. The inhabitants drive a considerable trade in ploughshares, mattocks, and other iron tools, which they manufacture from the neighbouring mines. The town is watered by a large river, supposed to be the *Nafava* of Ptolemy. The place is populous, and hath a considerable market for iron work, oil, and wax, which is carried on with great tranquillity; but is no sooner over than the whole place is in an uproar, so that the day seldom concludes without some flagrant instance of barbarity. E. Long. 4. N. Lat. 35. 30.

BUGIE, a town of Egypt, situated on the western shore of the Red Sea almost opposite to Ziden, the port-town to Mecca, and about 100 miles west of it. E. Long. 36. N. Lat. 22. 15.

BUGLE, in botany. See *AJUGA*.

BUGLOSS, in botany. See *ANCHUSA*.

Pipers **BUGLOSS**, in botany. See *ECHIUM*.

BUILDING, a fabric erected by art, either for devotion, magnificence, or convenience.

BUILDING is also used for the art of constructing and raising an edifice; in which sense it comprehends as well the expences as the invention and execution of the design.

As for the materials of buildings, they are either stone, as marble, free-stone, brick for the walls, mortar, &c. or of wood, as fir, cypress, cedars for pillars of upright uses, oak for summers, beams, and crop-work, or for joining and connection. See *ARCHITECTURE*.

BUILDING OF SHIPS. See *SHIP-BUILDING*.

BUILTH, or **BEALT**, a town of South-Wales in Brecknockshire, pleasantly seated on the river Wye, over which there is a wooden bridge that leads into Radnorshire. W. Long. 3. 19. N. Lat. 52. 8.

BUIS, a territory of France, in Dauphiny. It is a small mountainous country, but pretty fertile; and Buis and Nions are the principal places.

BUKARI, a small well-built town of Hungarian Dalmatia, situated on the Golfo di Bikeriza, in E. Long. 20. 53. N. Lat. 45. 20.

BUKHARIA, a general name for all that vast tract of land lying between Karazm and the great *Kobis*, or sandy desert bordering on China. It derives its name of *Bukharia* from the mogul word *Bukhar*, which signifies a learned man; it being formerly the custom for those who wanted instruction in the languages and sciences to go into *Bukharia*. Hence, this name appears to have been given to it by the Moguls who under Jenghiz Khan conquered the country. It is nearly the same with that called by the Arabs *Mawaralnahr*, which is little other than a translation of the word *Transoxana*, the name formerly given to these provinces.

This region is divided into Great and Little *Bukharia*.

Great Bukharia, (which seems to comprehend the *Sogdiana* and *Bactriana* of the ancient Greeks and Romans with their dependencies), is situated between the 34th and 46th degrees of north latitude, and between the 76th and 92^d degrees of east longitude. It is bounded on the north by the river *Sir*, which separates it from the dominions of the *Eluths* or Kalmucks; the kingdom of *Kashgar* in Little *Bukharia*, on the east; by

Bugie
|
Buckharia.

Bukharia.

by the dominions of the Great Mogul and Persia on the south; and by the country of Karazm on the west: being about 770 miles long from west to east, and 730 miles broad from south to north. It is an exceeding rich and fertile country; the mountains abound with the richest mines; the valleys are of an astonishing fertility in all sorts of fruit and pulse; the fields are covered with grass the height of a man; the rivers abound with excellent fish; and wood, which is scarce over all Grand Tartary, is here in great plenty. But all these benefits are of little use to the Tartar inhabitants, who are naturally so lazy, that they would rather go rob and kill their neighbours, than apply themselves to improve the benefits which nature so liberally offers them. This country is divided into three large provinces, *viz.* Bukharia proper, Samarcand, and Balk; each of which generally has its proper khan. The province of Bukharia proper is the most western of the three; having on the west Karazm, on the north a desert called by the Arabs *Gaznah*, on the east the province of Samarcand, and on the south the river Amu. It may be about 390 miles long, and 320 broad. The towns are Bokhara, Zam, Wardan, Karakul, Siunjabala, Karshi, Zarjui, Nersem, Karmina, &c.

Little Bukharia is so called, not because it is less in dimensions than the other, for in reality it is larger; but because it is inferior to it as to the number and beauty of its cities, goodness of the soil, &c. It is surrounded by deserts: it has on the west, Great Bukharia; on the north, the country of the Kalmucks; on the east, that of the Moguls subject to China; on the south, Thibet, and the north-west corner of China. It is situated between the 93^d and 118th degrees of east longitude, and between 35°, 30', and 45° of north latitude; being in length from east to west about 850 miles, and in breadth from north to south 580; but if its dimensions be taken according to its femicircular course from the south to the north-east, its length will be 1200 miles. It is sufficiently populous and fertile; but the great elevation of its land, joined to the height of the mountains which bound it in several parts, particularly towards the south, renders it much colder than from its situation might naturally be expected. It is very rich in mines of gold and silver; but the inhabitants reap little benefit by them, because neither the Eluths nor Kalmucks, who are masters of the country, nor the Bukhars, care to work in them. Nevertheless, they gather abundance of gold from the beds of the torrents formed by the melting of the snow in the spring; and from hence comes all that gold dust which the Bukhars carry into India, China, and Siberia. Much musk is likewise found in this country; and all sorts of precious stones, even diamonds; but the inhabitants have not the art of either cutting or polishing them.

The inhabitants both of Great and Little Bukharia, are generally those people called *Bukhars*. They are commonly sun-burned and black-haired; although some of them are very fair, handsome, and well made. They do not want politeness, and are addicted to commerce; which they carry on with China, the Indies, Persia, and Russia: but those who deal with them will be sure of being over-reached, if they do not take great care. The habits of the men differ very little from those of the Tartars. Their girdles are like those of the Poles. The garments of the women differ in nothing from

Bukharia.

those of the men, and are commonly quilted with cotton. They wear bobs in their ears, 12 inches long; part and twist their hair in tresses, which they lengthen with black ribbands embroidered with gold or silver, and with great tassels of silk and silver, which hang down to their heels; three other tufts of a smaller size cover their breasts. Both sexes carry about with them prayers written by their priests, which they keep in a small leathern purse by way of relics. The girls, and some of the women, tinge their nails red with the juice of an herb called by them *kena*: they dry and pulverize it; then mixing it with powder-alum, expose it in the air for 24 hours before they use it, and the colour lasts a long time. Both sexes wear close breeches, and boots of Russia leather, very light, and without heels, or leather soles; putting on galloches, or high-heeled slippers like the Turks, when they go abroad. They wear also the same sort of bonnets and covering for the head; only the women set off theirs with trinkets, small pieces of money, and Chinese pearls. Wives are distinguished from maids by a long piece of linen worn under their bonnets; which, folding round the neck, they tie in a knot behind, so that one end of it hangs down to the waist.

The Bukhar houses are of stone, and pretty good; but their moveables consist mostly of some China trunks plated with iron. Upon these, in the day-time, they spread the quilts they have made use of at night, and cover them with a cotton carpet of various colours. They have likewise a curtain sprigged with flowers and various figures; also a sort of bedstead half a yard high, and four yards long, which is hidden in the day-time with a carpet. They are very neat about their victuals; which are dressed in the master's chamber by his slaves, whom the Bukhars either take or buy from the Russians, Kalmucks, or other neighbours. For this purpose there are in the chamber, according to the largeness of the family, several iron pots, set in a kind of range near a chimney. Some have little ovens, made, like the rest of their walls, with a stiff clay or bricks. Their utensils consist of some plates and porringers made of Capua wood or of china, and some copper vessels. A piece of coloured calico serves them instead of a table-cloth and napkins. They use neither chairs nor tables, knives nor forks; but sit cross-legged on the ground; and the meat being served up, they pull it to pieces with their fingers. Their spoons resemble our wooden ladles. Their usual food is minced meat, of which they make pies of the form of a half-moon: these serve for provision when the Bukhars go long journeys, especially in winter. They carry them in a bag, having first exposed them to the frost; and when boiled in water, they make very good broth. Tea is their common drink, of which they have a black sort prepared with milk, salt, and butter; eating bread with it, when they have any.

As the Bukhars buy their wives, paying for them more or less according to their handiomeness; so the surest way to be rich is to have many daughters. The persons to be married must not see or speak to each other from the time of their contract to the day of marriage. This is celebrated with three days feasting, as they do great annual festivals. The evening before the wedding, a company of young girls meet at the bride's house, and divert themselves till midnight, play-

ing,

Bukharia. ing, dancing, and finging. Next morning the guests assemble, and help her to prepare for the ceremony. Then, notice being given to the bridegroom, he arrives soon after, accompanied by ten or twelve of his relations and friends. These are followed by some playing on flutes, and by an *Abur* (a kind of priest), who sings, while he beats two little timbrels. The bridegroom then makes a horse-race; which being ended, he distributes the prizes, six, eight, or twelve, in number, according to his ability. They consist of damasks, fables, fox-skins, calico, or the like. The parties do not see each other while the marriage ceremony is performing, but answer at a distance to the questions asked by the priest. As soon as it is over, the bridegroom returns home with his company; and after dinner carries them to the bride's house, and obtains leave to speak to her. This done, he goes back, and returns again in the evening, when he finds her in bed; and, in presence of all the women, lays himself down by her in his cloaths, but only for a moment. The same farce is acted for three days successively; but the third night he passes with her entirely, and the next day carries her home.

Although the prevailing religion throughout all Little Bukharia is the Mahometan, yet all others enjoy a perfect toleration. The Bukhars say that God first communicated the koran to mankind by Moses and the prophets; that afterwards Mahomet explained, and drew a moral from it, which they are obliged to receive and practise. They hold Christ to be a prophet, but have no notion of his sufferings. Yet they believe in the resurrection, but cannot be persuaded that any mortal shall be eternally damned: on the contrary, they believe, that as the demons led them into sin, so the punishment will fall on them. They believe moreover, that at the last day every thing but God will be annihilated; and, consequently, that all creatures, the devils, angels, and Christ himself, will die. Likewise, that, after the resurrection, all men, excepting a few of the elect, will be purified or chastised by fire, every one according to his sins, which will be weighed in the balance. They say there will be eight different paradises for the good; and seven hells, where sinners are to be purified by fire: that those who will suffer most, are liars, cheats, and others of that kind: that the elect who do not feel the fire will be chosen from the good; viz. one out of 100 men, and one out of 1000 women; which little troop will be carried into one of the paradises, where they shall enjoy all manner of felicity, till it shall please God to create a new world. It is a sin, according to them, to say, that God is in heaven. God, say they, is every where; and therefore it derogates from his omnipresence to say that he is confined to any particular place. They keep an annual fast of 30 days, from the middle of July to the middle of August, during which time they taste nothing all day; but eat twice in the night, at sun-set, and midnight: nor do they drink any thing but tea, all strong liquors being forbidden. Whoever transgresses these ordinances is obliged to emancipate his most valuable slave, or to give an entertainment to 60 people: he is likewise to receive 85 strokes on the back with a leathern strap called *dura*. The common people, however, do not observe this fast exactly, and workmen are allowed to eat in the day-time. The Bukhars say prayers five

times a-day; before morning, towards noon, afternoon, at sun-set, and in the third hour of the night.

Jenghis Khan, who conquered both the Bukharias from the Arabs, left the empire of them to his son Jagatay Khan. He died in the year 1240, and left the government to his son Kara Kulaku, and of Little Bukharia to another called *Amul Khoja Khan*. A long succession of khans is enumerated in each of these families, but their history contains no interesting particulars. They are long since extinct, and the Kalmuck Tartars are masters of the country.

BUL, in the ancient Hebrew chronology, the eighth month of the ecclesiastical, and the second of the civil year; it has since been called *Marshewan*, and answers to our October.

BULAC, a town of Egypt, situated on the eastern shore of the river Nile, about two miles west of Grand Cairo, of which it is the port-town, and contains about 4000 families. It is a place of great trade, as all the vessels going up and down the Nile make some stay here. It is also at this place that they cut the banks of the river every year, in order to fill their canals, and overflow the neighbouring grounds, without which the soil would produce neither grain nor herbage. E. Long. 32°. N. Lat. 30°.

BULAFU, a musical instrument, consisting of several pipes of wood tied together with thongs of leather, so as to form a small interstice between each pipe. It is used by the negroes of Guinea.

BULARCHUS, a Greek painter; the first who introduced (among the Greeks at least) different colours in the same picture. He flourished 740 B. C.

BULB, in the anatomy of plants, a kind of large bud, generally produced under the ground, upon or near the root of certain herbaceous plants, hence denominated *bulbous*.

A bulb is defined by Linnæus to be a species of hybernaculum, produced upon the descending caudex, or root; consisting of stipulæ, petioli, the rudiments of the former leaves, and scales of bark †.

To elucidate this definition, it is proper to remark, that every bud contains, in miniature or embryo, a plant, in every respect similar to the parent plant upon which it is seated *. Plants therefore are perpetuated in the buds, as well as in the seeds; and the species may be renewed with equal efficacy in either way.

The tender rudiments of the future vegetable of which the bud is composed, are inclosed, and during the severities of winter defended from cold and other external injuries, by a hard bark or rind, which generally consists of a number of scales placed over each other like tiles, and fastened together by means of a tenacious, resinous, and frequently odoriferous substance. Thus defended, the buds remain upon different parts of the mother plant, till the ensuing spring; and are, therefore, with great propriety, denominated by Linnæus the *hybernaculum* or winter-quarters of the future vegetable.

With respect to their place, buds are situated either upon the stem and branches, or upon the roots: the former are styled *gemmæ*, or buds properly so called; but as they subsist several years by their roots, may be furnished with the other species of *hybernaculum*, called *bulbæ*, which, according to the definition, are seated upon the descending caudex of the root.

Again,

Bul
Bulb.

† See *Hybernaculum*, and *Caudex*.

* See the article *Plants*.

Bulb.

Again, trees which are perennial, with a woody and durable stem or trunk, have generally proper buds or gemmæ, but no bulbs.

In bulbous plants, as the tulip, onion, or lily, what we generally call the *root*, is in fact a bulb or hybernaculum, which incloses and secures the embryo or future shoot.

At the lower part of this bulb may be observed a fleshy knob or tubercle, from whence proceed a number of fibres or threads. This knob, with the fibres attached to and hanging from it, is, properly speaking, the true root; the upper part being only the cradle, or nursery of the future stem, which after the bulb has repaired a certain number of times, it perishes; but not till it has produced, at its sides, a number of smaller bulbs, or suckers, for perpetuating the species.

One part of Linnaeus's definition still remains obscure. The bulb, says he, is composed of the remains or rudiments of the former leaves of the plant; *e rudimento foliorum præteritorum*.

It is easy to comprehend that buds contain the rudiments of the future leaves; but how can bulbs be said to contain the rudiments of leaves that, to all appearance, are already perished? To explain this, let it be observed, that, in the opinion of very eminent botanists, the root, in a very great number of perennial herbs, is annually renewed, or repaired out of the trunk or stalk itself; in which sense, only roots are properly said to descend.

In the perennials alluded to, the basis of the stalk continually, and by insensible degrees, descends below the surface of the earth, and is thus changed into a true root; which root, by the continuance of the said motion of the stalk, also descends; and thus, according to the durability of its substance, becomes a longer or shorter root; the elder, or lower part, rotting off in proportion as the upper is generated out of the stalk. Thus, in brownwort, the basis of the stalk sinking down by degrees till it is hid under the ground, becomes the upper part of the root; and continuing still to sink, the next year becomes the lower part, and the following year rots away.

This is exactly what obtains in bulbous roots, as well as in the far greater number of other herbaceous perennials, as arum, valerian, tansey, samphire, primrose, woodforrel, iris, and others.

The immediate visible cause of this descent is the string-roots which this kind of trunks frequently puts forth; which descending themselves directly into the ground, serve, like so many ropes, for pulling the trunk after them. Hence the tuberous roots of iris are sometimes observed to reascend a little upon the rotting or fading away of the string-roots which hang at them.

In bulbous roots, where the stalk and former leaves of the plant are sunk below, and formed into what is called the *bulb*, or wintering of the future vegetable, the radicles, or small fibres that hang from the bulb, are to be considered as the root; that is, the part which furnishes nourishment to the plant: the several rinds and shells whereof chiefly the bulb consists, successively perish, and shrink up into so many dry skins; betwixt which, and in their centre, are formed other leaves and shells, and thus the bulb is perpetuated.

What has been said of the descent of roots by the sinking of the stalk, is further confirmed by the ap-

pearance of certain roots; as of valerian, plantago major, and devil's-bit, in which the lower part appears bitten or chopped off. In these the lower part rotting off as the upper descends, the living remainder becomes stumped, or seems bitten.

All bulbous roots, says the learned Dr Grew in his anatomy of plants, may be considered as hermaphrodite roots, or root and trunk both together: for the radicles or string-roots only, are absolute roots; the bulb actually containing those parts which, springing up, make the body or leaves of the plant; so that it may be regarded as a large bud under ground.

Bulbous roots are said to be solid, when composed of one uniform lump of matter; tunicated, when formed of multitudes of coats surrounding one another; squamose, when composed of, or covered with, leffer flakes; duplicate, when there are only two to each plant; and aggregate, when there is such a congeries of such roots to each plant.

BULBOCASTANUM, in botany. See **BUNIUM**.

BULBOCADIUM, MOUNTAIN-SAFFRON; a genus of the monogynia order, belonging to the hexandria class of plants; of which there are two species, the alpinum and vernum. The first sort grows naturally on the Alps, and also on Snowdon in Wales. It hath a small bulbous root, which sends forth a few long narrow leaves somewhat like those of saffron, but narrower. In the middle of these the flower comes out, which stands on the top of the footstalk, growing erect, and is shaped like those of the crocus, but smaller; the footstalk rises about three inches high, and hath four or five short narrow leaves placed alternately upon it below the flower. This flowers in March, and the seeds are ripe in May. The second is a native of Spain. It hath a bulbous root shaped like those of the snow-drop, which sends out three or four spear-shaped concave leaves, between which comes out the flower, standing on a very short footstalk. The flowers appear about the same time with the last; at first they are of a pale colour, but afterwards change to a whitish purple. These plants may be propagated by off-sets at the decay of the flower and leaf every second or third year; also, by sowing the seed in pots in autumn, sheltering them in a frame from frost; and the plants will appear in the spring, which, at the decay of the leaves, may be taken up for planting in the borders in October, where they will flower the year following.

BULBOSE, or **BULBOUS**. See **BULB**.

BULENTÆ, in Grecian antiquity, were magistrates answering to the decuriones among the Romans. See **DECURIO**.

BULGARIA, a small province of Turkey in Europe, bounded on the north by Wallachia, on the east by the Black Sea, on the south by Romania and Macedonia, and on the west by Servia. It is very narrow, but 325 miles long on the side of the Danube, from Servia till it falls into the Black sea. The inhabitants are Christians; but extremely ignorant, inasmuch that they seem to know nothing of Christianity but baptism and fasting. It is divided into four sangiacates; Byden, Sardice, Nicopolis, and Silistria. The chief towns are of the same names, except Sardice, which is now called *Sophia*.

BULGARIAN Language, the same with the **SLAVONIC**.

Bulbocastanum
|| Bulgaria.

Bulimy
||
Bull.

* See (the
Index sub-
joined to)
Medicine.

BULIMY, a disease in which the patient is affected with an insatiable and perpetual desire of eating; and, unless he is indulged, he often falls into fainting fits. It is also called *james canina*, canine appetite†.

BULITHUS, a stone found either in the gall-bladder, or in the kidneys and bladder, of an ox. See *Bos*.
BULK of a *SHIP*, the whole content in the hold for the stowage of goods.

BULK-HEADS are partitions made athwart the ship with boards, by which one part is divided from the other; as the great cabin, gun-room, bread-room, and several other divisions. The *bulk-head afore* is the partition between the fore-castle and gratings in the head.

BULL (Dr John), a celebrated musician and composer, was born in Somersetshire about the year 1563, and, as it is said, was of the Somerset family. He was educated under Blitheman. In 1586, he was admitted at Oxford to the degree of bachelor of music, having practised in that faculty 14 years; and in 1592, was created doctor in the university of Cambridge. In 1591, he was appointed organist of the queen's chapel, in the room of his master, Blitheman.

Bull was the first Gresham professor of music, and was appointed to that station upon the special recommendation of queen Elizabeth. However skilful he might be in his profession, it seems he was not able to read his lectures in Latin; and therefore, by a special provision in the ordinances respecting the Gresham professors, made anno 1597, it is declared, that because Dr Bull is recommended to the place of music-professor by the queen's most excellent majesty, being not able to speak Latin, his lectures are permitted to be altogether English, so long as he shall continue music-professor there.

In the year 1601, he went abroad for the recovery of his health, which at that time was declining; and during his absence was permitted to substitute as his deputy, a son of William Bird, named *Thomas*. He travelled incognito into France and Germany; and Wood takes occasion to relate a story of him while abroad, which the reader shall have in his own words.

"Dr Bull hearing of a famous musician belonging to a cathedral in St Omer's, he applied himself, as a novice, to him, to learn something of his faculty, and to see and admire his works. This musician, after some discourse had passed between them, conducted Bull to a vestry or music-school joining to the cathedral, and shewed him a lesson or song of 40 parts; and then made a vaunting challenge to any person in the world to add one part more to them, supposing it to be so complete and full, that it was impossible for any mortal man to correct or add to it. Bull thereupon, desiring the use of pen, ink, and ruled paper, such as we call *musical paper*, prayed the musician to lock him up in the said school for two or three hours; which being done, not without great disdain by the musician, Bull, in that time or less, added 40 more parts to the said lesson or song. The musician thereupon being called in, he viewed it, tried it, and retied it; at length he burst out into a great ecstasy, and swore by the great God, that he that added these 40 parts must either be the devil or Dr Bull. Whereupon Bull making himself known, the musician fell down and adored him. Afterwards continuing there and in those parts for a time,

he became so much admired, that he was courted to accept of any place of preferment suitable to his profession, either within the dominions of the emperor, the king of France, or Spain; but the tidings of these transactions coming to the English court, queen Elizabeth commanded him home." *Fassi*, anno 1586.

Dr Ward, who has given the life of Dr Bull, in his lives of the Gresham professors, relates, that upon the decease of queen Elizabeth he became chief organist to king James, and had the honour of entertaining his majesty and prince Henry at Merchant Taylor's hall with his performance on the organ. The same author proceeds to relate, that in 1613, Bull quitted England, and went to reside in the Netherlands, where he was admitted into the service of the archduke. He suggests, as the reason for Bull's retirement, that the science began to sink in the reign of king James; which he infers from that want of court-patronage, which, it seems, induced the musicians of that day to dedicate their works to one another. But surely Bull had none of these reasons to complain of being slighted that others had. He was in the service of the chapel, and at the head of the prince's musicians; and in the year 1604 his salary for the chapel-duty had been augmented. The circumstances of his departure from England may be collected from the following entry now to be seen in the cheque book: "1613, John Bull doctor of music went beyond seas without licence, and was admitted into the archduke's service, and entered into paise there about Mich. and Peter Hopkins a bafe from Paul's was sworn into his place the 27th of December following. His wages from Mich. unto the day of the swearing of the said Peter Hopkins was disposed of by the deane of his majesty's chapel." Wood says, that Dr Bull died at Hamburg; others have said at Lubeck.

The only works of Bull in print are lessons in the "Parthenia, or the maiden-head of the first music that ever was printed for the virginals." An anthem of his, "Deliver me, O God," is to be found in Bernard's collection of church-music. Dr Ward has given a long list of compositions of Dr Bull in manuscript in the collection of the late Dr Pepusch, by which it appears that he was equally excellent in vocal and instrumental harmony. By some of the lessons in the Parthenia it seems that he was possessed of a power of execution on the harpsichord far beyond what is generally conceived of the masters of that time. As to his lessons, they were, in the estimation of Dr Pepusch, not only for the harmony and contrivance, but for air and modulation, so excellent, that he scrupled not to prefer them to those of Couperin, Scarlatti, and others of the modern composers for the harpsichord.

BULL (George), bishop of St David's, was born at Wells, in 1634; and educated at Exeter college, in Oxford. The first benefice he enjoyed was that of St George's, near Bristol, whence he rose successively to be rector of Suddington in Gloucestershire, prebendary of Gloucester, archdeacon of Llandaff, and in 1705 bishop of St David's. This dignity he enjoyed about four years, and died in 1709. During the usurpation of Cromwell, he adhered steadily, though still with great prudence, to the forms of the church of England; and in the reign of James II. preached very strenuously against the errors of Popery. 1. A defence of the Nicene faith. 2. Apostolical harmony.

3. Primitive apostolical tradition; and other works.

BULL, in zoology. See BOS.

Wild Bulls. The wild bulls now so numerous on the continent of America, are said to have sprung from one bull and seven cows, which were carried thither by some of the first conquerors. For the manner of hunting these, see BUCANERS.

BULL, in astronomy. See ASTRONOMY, n° 206.

Bull's-Eye, among seamen, a small, obscure, sub-line cloud, ruddy in the middle, that sometimes appear to mariners, and is the immediate forerunner of a great storm at sea.

Bull-Fighting, a sport or exercise much in vogue among the Spaniards and Portuguese, consisting in a kind of combat of a cavalier or torador against a wild bull, either on foot or on horseback, by riding at him with a lance. The Spaniards have bull-fights, i. e. feasts attended with shews, in honour of St John, the Virgin Mary, &c. This sport the Spaniards received from the Moors, among whom it was celebrated with great éclat. Some think that the Moors might have received the custom from the Romans, and they from the Greeks. Dr Plot is of opinion, that the Ταυρομαχίαν ήμίραι among the Thessalians, who first instituted this game, and of whom Julius Cæsar learned and brought it to Rome, were the origin both of the Spanish and Portuguese bull-fighting, and of the English bull-running. This practice was prohibited by Pope Pius V. under pain of excommunication incurred *ipso facto*. But succeeding popes have granted several mitigations in behalf of the toradors.

Bull-Running, denotes a feudal custom obtaining in the honour of Tutbury in Staffordshire; where, anciently, on the day of the assumption of our Lady, a bull is turned loose by the lord to the minstrels; who, if they can catch him before he passes the river Dove, are to have him for their own, or, in lieu thereof, to receive each 40 pence; in consideration of which custom they pay 20 pence yearly to the said lord.

BULL-Finch, in ornithology. See LOXIA.

BULL-Frog, in zoology. See RANA.

Bull-Head, or *Miller's-Thumb*, in ichthyology. See COTTUS.

BULL, among ecclesiastics, a written letter, dispatched, by order of the Pope, from the Roman chancery, and sealed with lead, being written on parchment, by which it is partly distinguished from a brief: see the article BRIEF.—It is a kind of apostolical script, or edict; and is chiefly in use in matters of justice or grace. If the former be the intention of the bull, the lead is hung by a hempen chord; if the latter, by a silken thread. It is this pendent lead, or seal, which is, properly speaking, the bull, and which is impressed on one side with the heads of St Peter and St Paul, and on the other with the name of the Pope and the year of his pontificate. The bull is written in an old, round, Gothic letter, and is divided into five parts, the narrative of the fact, the conception, the clause, the date, and the salutation, in which the Pope styles himself *servus servorum*, i. e. the servant of servants. These instruments, besides the lead hanging to them, have a cross, with some text of scripture, or religious motto, about it. Bulls are granted for the consecration of bishops, the promotion to benefices, and the celebration of jubilees, &c.

BULL in *cena Domini*, a particular bull read every year, on the day of the Lord's supper, or Maundy Thursday, in the Pope's presence, containing excommunications and anathemas against heretics, and all who disturb or oppose the jurisdiction of the holy see. After the reading of the bull, the Pope throws a burning torch in the public place, to denote the thunder of this anathema.

Golden BULL, an edict, or imperial constitution, made by the emperor Charles IV. reputed to be the magna charta, or the fundamental law of the German empire.

It is called *golden*, because it has a golden seal, in the form of a pope's bull, tied with yellow and red cords of silk: upon one side is the emperor represented sitting on his throne, and on the other the capitol of Rome. It is also called *Caroline*, on Charles IV.'s account. Till the publication of the golden bull, the form and ceremony of the election of an emperor were dubious and undetermined, and the number of the electors not fixed. This solemn edict regulated the functions, rights, privileges, and pre-eminences, of the electors. The original, which is in Latin, on vellum, is preserved at Frankfort: this ordonnance, containing 30 articles or chapters, was approved of by all the princes of the empire, and remain still in force.

Silver BULLS were not in so frequent use; tho' we do not want instances of them.

Lead bull were sent by the emperors of Constantinople to despots, patriarchs, and princes; and the like were also used by the grandes of the Imperial court, as well as by the kings of France, Sicily, &c. and by bishops, patriarchs, and popes. It is to be observed, that the leaden bulls of these last had, on one side, the name of the pope or bishop inscribed. Polydore Virgil makes Pope Stephen III. the first who used leaden bulls, about the year 772. But others find instances of them as early as Silvester, Leo I. and Gregory the Great. The latter popes, beside their own names, strike the figures of St Peter and St Paul on their bulls; a practice first introduced by Pope Paschal II. But why, in these bulls, the figure of St Paul is on the right, and that of St Peter on the left side, is a question which has occasioned many conjectures and disputes.

Waxen BULLS are said to have been first brought into England by the Normans. They were in frequent use among the Greek emperors, who thus sealed letters to their wives, mothers, and sons. Of these there were two sorts, one red, and the other green.

BULLA, or **DIPPER,** in zoology, a genus belonging to the order of vermes testaceæ. It is an animal of the snail-kind: the shell consists of one valve, convoluted, and without any prickles; the aperture is narrowish, oblong, longitudinal, and entire at the base; the columella is smooth and oblique. There are 23 species; four of them found in the British seas; the rest chiefly natives of the Asiatic and Atlantic oceans †.

BULLÆ, in antiquity, a kind of ornaments much in use among the ancient Romans. Mr Whittaker * is of opinion that they were originally formed of leather among all ranks of people; and it is certain, that they continued so to the last among the commonalty. He also imagines, that at first the bulla was intended as an amulet rather than an ornament; as a proof of which he tells us that the bulla were frequently impressed with

† See Plate LXVI.

fig. 2.

* History of Manchester, Vol. I. p. 19.

Bullæ,
Bulley.

the figure of the sexual parts. It is universally asserted by the critics, that the bullæ were made hollow for the reception of an amulet; but this Mr Whittaker contradicts from the figure of a golden one lately found at Manchester, which had no aperture whereby an amulet could have been introduced.—Pliny refers the original of the bulla to the elder Tarquin, who gave one with the pretexta to his son, because at the age of 14 he had with his own hand killed an enemy; and in imitation of him it was afterwards assumed by other patricians. Others affirm that the bulla was given by that king to the sons of all the patricians who had born civil offices. Lastly, others allege that Romulus first introduced the bulla, and gave it to Tullus Hostilius, the first child born of the rape of the Sabines.—As to the form of the bullæ, Mr Whittaker informs us that they were originally made in the shape of hearts; but they did not always retain the form of an heart, any more than they were always made of leather. As the wealth of the state and the riches of individuals increased, the young patrician distinguished himself by a bulla of gold, while the common people wore the amulet of their ancestors. The figure of an heart then became so generally round, some even having the impression of an heart upon them, that there are not many of the original form to be found in the cabinets of the curious. The form is naturally varied from a complete circle, to that of a segment; and this was the shape of the abovementioned bulla found at Manchester. When the youth arrived at 15 years of age, they hung up their bullæ about the necks of their gods lars. We are further informed, that the bullæ were not only hung about the necks of young men, but of horses also. We may add, that bullæ were sometimes allowed to statues; whence the phrase *statuæ bullatæ*.

BULLÆ was also the denomination given to divers other metalline ornaments made after the same form; and in this sense bullæ seem to include all gold and silver ornaments of a roundish form, whether worn on the habits of men, the trappings of horses, or the like. Such were those decorations used by the ancients on their doors and belts. The bullæ of doors were a kind of large-headed nails fastened on the doors of the rich, and kept bright with great care. The doors of temples were sometimes adorned with golden bullæ. Mr Banelot takes the bullæ worn by soldiers on their belts to be something more than mere ornaments. They seem to have been considered as preservations from dangers and diseases, and even means of acquiring glory, and other advantages. The like may perhaps be extended to the bullæ on doors, which were probably placed there as a security to them from being broken or violated.

BULLÆ also denoted a table hung up in the public courts, to distinguish which days were fasti, and which nefasti; answering in some measure to our calendar.

BULLEYN (William), a learned physician and botanist, was born in the Isle of Ely, in the former part of the reign of Henry VIII. and educated at Cambridge. Botany being his favourite study, he travelled through various parts of England, Scotland, and Germany, chiefly with an intention to improve his knowledge in that science. In the reign of Edward VI. or of queen Mary, Mr Bulleyn appears, from his remarks on the natural productions of that country, to have resided at Norwich, or in that neighbourhood, and

also to have spent some time at Bloxhall in Suffolk: but he afterwards removed into the north, and settled at Durham, where he practised physic with considerable reputation and success. His great patron at this time was Sir Thomas Hilton, knight, baron of Hilton, who was governor of Timmouth castle in the reign of Philip and Mary. In 1560, he came to London; and soon after his arrival, was accused by William Hilton of Bidick, of having murdered his brother Sir Thomas, our author's friend and patron. He was arraigned before the duke of Norfolk, and honourably acquitted. This Hilton afterwards hired some villains to assassinate the doctor; but this attempt proving ineffectual, he had him arrested on an action for debt, and he remained for a long time in prison. During this confinement, Dr Bulleyn composed several of those works which raised his reputation as a medical writer. He died in January 1576, and was buried in St Giles's Cripplegate, in the same grave with his brother the divine, who died 13 years before, and in which John Fox the martyrologist was interred 11 years after. Dr Bulleyn appears from his writings to have been well acquainted with the works of the ancient Greek, Roman, and Arabian physicians. According to the modern practice, his books, were they generally known, would be of little use; but as he was a man of genius and fertile imagination, they are by no means barren of entertainment. He wrote, 1. The government of health, 1559, 8^{vo}. According to Anthony Wood, it was first printed in 1548; but the dedication to his patron, baron Hilton, is dated 1548, 1595, 12^{mo}. 2. A regimen against the pleurisy, 8^{vo}. London, 1562. 3. Bulleyn's bulwark of defence against all sicknesses, forenes, and wounds, that dooe daily assaunt mankind, London printed by John Kingston, 1562, folio. This includes, The government of health. 4. A dialogue both pleasant and pitefull, wherein is a goodlie regiment against the fever petilence, with a consolation and comfort against death, London, 1564, 8^{vo}. 1569, 8^{vo}. Very scarce. There is a wooden print of the author prefixed to the first edition of his Government of health; also a small one engraved by Stukeley in 1722.

BULLET, an iron or leaden ball or shot, wherewith fire arms are loaded. Bullets are cast in iron moulds, consisting of two concave hemispheres, with a handle whereby to hold them; and between them is a hole, called the *gate*, at which to pour in the melted metal. The chaps or hemispheres of bullet-moulds are first punched, being blood-red hot, with a round-ended punch, of the shape and nearly of the size of the intended bullets. To cleanse the insides, they make use of a bullet bore, which consists of a steel shank, having a globe at one end, wherewith to bore the inside of a mould clean, and of the intended size.

BULLIALDUS (Ismael), an eminent astronomer, was born at Laon in the Isle of France in 1605. He travelled in his youth for the sake of improvement; and afterwards published several works, among which are, 1. *De natura lucis*. 2. *Philolaus*. 3. *Astronomia philolaica, opus novum, in quo motus planetarum per novam et veram hypothesein demonstrantur*. 4. *Astronomie philolaice fundamenta clarius explicata et asserta adversus Zothi Wardi impugnationem*. He also wrote a piece or two upon Geometry and Arithmetic. In 1661, he paid Hevelius a visit at Dantzic, for the sake of seeing his optical

Bulley
Bullialdus.

optical and astronomical apparatus. Afterwards he became a presbyter at Paris, and died there in 1694.

BULLINGER (Henry), born at Bremgarten in Switzerland in 1504, was an eminent Zuinglian minister, a great supporter of the reformation, and employed in many ecclesiastical negotiations. He composed many books, one against Luther in particular. He died in 1575.

BULLION, uncoined gold or silver in the mafs.

Those metals are called fo, either when melted from the native ore, and not perfectly refined; or when they are perfectly refined, but melted down in bars or ingots, or in any unwrought body, of any degree of fineness.

When gold and silver are in their purity, they are so soft and flexible, that they cannot well be brought into any fashion for use, without being first reduced and hardened with an alloy of some other baser metal.

To prevent these abuses which some might be tempted to commit in the making of such alloys, the legislators of civilized countries have ordained, that there shall be no more than a certain proportion of a baser metal to a particular quantity of pure gold or silver, in order to make them of the fineness of what is called the standard gold or silver of such a country.

According to the laws of England, all sorts of wrought plate in general ought to be made to the legal standard; and the price of our standard gold and silver is the common rule whereby to set a value on their bullion, whether the same be in ingots, bars, dust, or foreign specie: whence it is easy to conceive that the value of bullion cannot be exactly known, without being first essayed, that the exact quantity of pure metal therein contained may be determined, and consequently whether it be above or below the standard.

Silver and gold, whether coined or uncoined, (though used for a common measure of other things), are no less a commodity, than wine, tobacco, or cloth; and may, in many cases, be exported as much to the national advantage as any other commodity.

BULLOCK, the same with an ox, or gelded bull*.

BULLY-TREE, in botany. See *CHRYSOPHYLLUM*.

BULTER, a term used to denote the refuse of meal after dressing, or the cloth wherein it is dressed, otherwise called *bulter-cloth*.

BULWARK, in the ancient fortification. See *RAMPART*.

BUMICILLI, a religious sect of Mahometans in Egypt and Barbary, who pretend to fight with devils, and commonly appear in a fright and covered with wounds and bruises. About the full moon they counterfeit a combat in the presence of all the people, which lasts for two or three hours, and is performed with assaigas, or javelins, till they fall down quite spent; in a little time, however, they recover their spirits, get up, and walk away.

BUNDLE, a collection of things wrapped up together. Of batte-ropes, harness-plates, and gloves knives, ten make a bundle; of Hamburg yarn, twenty skeans; of basket-rods, three feet about the band.

BUNEL (Peter), a native of Toulouse, was one of the most elegant writers of the Latin tongue in the 16th century, but was still more conspicuous for the regularity of his manners. He did not seek either for riches or lucrative employments; but, contented with the bare

necessaries of life, applied himself wholly to the improvement of his mind. He died at Turin in 1547, aged 47; and has left behind him some Latin epistles, which are written with the utmost purity. The magistrates of Toulouse have a bust of him in marble, placed in their town-house. The most correct edition of his Letters is that of Henry Stephens in 1581.

BUNGAY, a market-town of Suffolk, situated on the river Wavenny, about 32 miles north-east of Bury. E. Long. 1. 35. N. Lat. 52. 35.

BUNIAS, a genus of the filiquosa order, belonging to the tetradynamia class of plants, for which there is no English name. There are three species; all of them annual plants, but none of them possessed of any remarkable property.

BUNIAM, *FIG-NUT*, or *earth-nut*; a genus of the digynia order, belonging to the pentandria class of plants; of which there are three species. 1. The *bulbocastanum*, with a globular root. This grows naturally in moist pastures in many parts of Britain. It hath a tuberous solid root, which lies deep in the ground. The leaves are finely cut, and lie near the ground. The stalk rises a foot and an half high; is round, channelled, and solid; the lower part being naked; but above, where it branches out, there is one leaf placed below every branch. The flowers are white, and shaped like those of other umbelliferous plants; the seeds are small, oblong, and when ripe are channelled. The roots of this sort are frequently dug up, and by some people eaten raw. They have much resemblance in taste to a chestnut, whence the plant obtains the name of *bulbocastanum*. 2. The creticum, with a turbinated root, was discovered by Dr Tournefort in Crete, whence it took its name; but it grows naturally in many other parts of the Levant. 3. The faxatile, with very narrow tripartite leaves. This Mr Miller received from the Alps; it is a low plant, seldom rising above six inches high.—All the species delight to grow among grafs, so cannot be made to thrive long in a garden.

BUNT of a SAIL, the middle part of it, formed designedly into a bag or cavity, that the sail may gather more wind. It is used mostly in top-sails, because courses are generally cut square, or with but small allowance for bunt or compafs. The bunt holds much leeward wind; that is, it hangs much to leeward.

BUNT-Lines are small lines made fast to the bottom of the sails, in the middle part of the bolt-rope, to a cringle, and so are reeved through a small block, seized to the yard. Their use is to trice up the bunt of the sail for the better furling it up.

BUNTING, in ornithology. See *EMBERIZA*.

BUNTINGFORD, a town of Hertfordshire, with a market on Mondays, and two fairs, on June 29th, and November 30th, for pedlars ware. It is a good thoroughfare town, but small, and is accounted only a large hamlet. W. Long. o. 6. N. Lat. 51. 55.

BUNTZEL, or *BUNTZLAU*, a town of Silesia, in the duchy of Jauer. The greatest part of the houses are built with stone, and there were formerly rich mines in the neighbourhood. It is in the common road to Leipsick; and their trade is earthen ware, of which they make great quantities. E. Long. 15. 50. N. Lat. 51. 12.

BUNYAN (John), author of the Pilgrim's Progress, was born at Elstow, near Bedford, in 1628. He was the son of a tinker; and, in the early part of his

Buonocarsi,
Buoy.

life, was a great reprobate, and a soldier in the parliament army: but being at length deeply struck with a sense of his guilt, he laid aside his profligate courses, became remarkable for his sobriety, and applied himself to obtain some degree of learning. About the year 1655, he was admitted a member of a Baptist congregation at Bedford, and was soon after chosen their preacher: but, in 1660, being taken up, and tried for presuming to preach, he was cruelly sentenced to perpetual banishment; and in the mean time committed to jail, where necessity obliged him to learn to make long-tagged thread-laces for his support: to add to his distress, he had a wife and several children, among whom was a daughter who was blind. In this unjust and cruel confinement he was detained twelve years and a half, and during that time wrote many of his tracts; but he was at length discharged, by the humane interposition of Dr Barlow. When king James's declaration for liberty of conscience was published, he was chosen pastor of a congregation at Bedford. He at length died of the fever at London, on the 31st of August 1688, aged 60. He also wrote an allegory, called *The Holy War*. His *Pilgrim's Progress* has been translated into most European languages; and his works have been collected together, and printed in two volumes folio.

BUONOCARSI, or PIERINO DEL VAGA. See PIERINO.

BUOY, in sea affairs, a sort of close cask, or block of wood, fastened by a rope to the anchor, to determine the place where the anchor is situated, that the ship may not come too near it, to entangle her cable about the flock or the flukes of it.

Buoys are of various kinds; as,

Can Buoys: these are in the form of a cone; and of this construction are all the buoys which are floated over dangerous banks and shallows, as a warning to passing ships, that they may avoid them. They are extremely large, that they may be seen at a distance; and are fastened by strong chains to the anchors which are sunk for this purpose at such places. See Plate LXV. fig. 6.

Nun-Buoys are shaped like the middle frustum of two cones, abutting upon one common base, being casks, which are large in the middle, and tapering nearly to a point at each end. Plate LXV. fig. 7.

Wooden Buoys are solid pieces of timber, sometimes in the shape of a cylinder, and sometimes in that of a nun-buoy; they are furnished with one or two holes, in which to fix a short piece of rope, whose two ends, being spliced together, make a sort of circle or ring called the *floop*.

Cable-Buoys, are common casks employed to buoy up the cables in different places from rocky ground. In the harbour of Alexandria, in Egypt, every ship is moored with at least three cables, and has three or four of these buoys on each cable for this purpose.

Slings of the Buoy, the ropes which are fastened about it, and by which it is hung: they are curiously spliced round it, something resembling the braces of a drum.

To *stream the Buoy*, is to let it fall from the ship's side into the water; which is always done before they let go the anchor, that it may not be retarded by the buoy-rope as it sinks to the bottom.

Buoy-Rope, the rope which fastens the buoy to the anchor: it should be little more than equal in length

to the depth of the water where the anchor lies, as it is intended to float near, or immediately above, the bed of it, that the pilot may at all times know the situation thereof. See Plate XXII. fig. 1. n^o 3.; where *b* is the anchor, *c* the buoy-rope, and *d* the buoy floating on the surface of the water. The buoy-rope is often extremely useful otherwise, in drawing up the anchor when the cable is broke. It should always, therefore, be of sufficient strength for this purpose, or else the anchor may be lost through negligence.

BUOYANT, something which, by its aptness to float, bears up other more ponderous and weighty things *.

* See Buoy.

Buoy of the Nore, is a buoy placed at the mouth of the river Thames, to direct mariners how to avoid a dangerous sand.

BUPALUS, a celebrated sculptor, and native of the island of Chios, was son, grandson, and great-grandson of sculptors. He had a brother, named *Athenis*, of the same profession. They flourished in the 60th Olympiad; and were cotemporary with Hipponax, a poet of an ugly and depicable figure. Our sculptors diverted themselves in representing him under a ridiculous form. But Hipponax wrote so sharp a satire against them, that they hanged themselves, as some say. Pliny, however, does not allow this; but says, on the contrary, that, after Hipponax had taken his revenge, they made several fine statues in several places; particularly a Diana at Chios, which was placed very high, and appeared with a frowning countenance to those that came in, and with a pleasant one to those that went out. There were several statues at Rome made by them; and they worked only in the white marble of the isle of Paros. Pausanias mentions Bupalus as a good architect as well as sculptor; but says nothing of Athenis.

BUPHAGA, in ornithology, a genus belonging to the order of picæ. The beak is straight and quadrangular; the mandibles are gibbous, entire, and the gibbosity is greater on the outside. The feet are of the ambulatory kind. The body is greyish above, and of a dirty yellow below; the tail is shaped like a wedge. There is but one species, viz. the *africana*, a native of Senegal. It frequently perches upon oxen, and picks out the worms from their backs.

BUPHTHALMUM, ox-eye; a genus of the polygamia superflua order, belonging to the syngenesia class of plants. There are ten species; of which the following are the most remarkable.

Species. 1. The *helianthoides*, a native of North America. This hath a perennial root, and an annual stalk, which rises six or eight feet high, garnished at each joint with two oblong heart-shaped leaves, which have three longitudinal veins, and the base on one side shorter than the other. The flowers come out at the extremities of the branches, and are of a bright yellow colour, resembling a small sun-flower. 2. The *arborescens*, rises with several woody stems to the height of eight or ten feet, garnished with leaves very unequal in size; some are narrow and long, others are broad and obtuse; these are intermixed at the same joint, and often at the intermediate one; they are green, and placed opposite. The flowers are produced at the ends of the branches; they are of a pale yellow colour, and have scaly empalements.

Culture. All the species may be propagated by seeds; and those which do not, by parting their roots,

Buoyant
Buphtalmum.

Bupleurum or cuttings of their branches. Some of the species are tender, and require to be raised on a hot-bed.

BUPLEURUM, HARE'S-EAR, or *thorough-wax*; a genus of the digynia order, belonging to the pentandria class of plants. There are 17 species, of which only the following is remarkable, viz. the fruticofum, or shrubby Ethiopian hartwort. This rises with a shrubby stem, dividing into numerous branches, forming a bushy head five or six feet high, adorned with oblong, oval, entire leaves of a pale green colour, placed alternate, with yellow flowers in umbels at the ends of the branches, which appear in July and August, and are sometimes succeeded by ripe seeds. It may be propagated by cuttings.

BUPRESTIS, in zoology, a genus of insects belonging to the order of coleoptera. The feelers are like bristles, and about the length of the breast; the head is half retracted into the thorax. There are 27 species of this insect, most of them natives of the Indies.

BUQUOI, a town of Artois, in the French Netherlands, situated on the confines of Picardy. E. Long. 2. 40. N. Lat. 50. 12.

BUR, a broad ring of iron, behind the place made for the hand on the spears used formerly in tilting; which bur was brought to rest, when the tilter charged his spear.

BURBAS, in commerce, a small coin at Algiers, with the arms of the dey struck on both sides: it is worth half an asper.

BURCHAUSEN, a town of Germany, in the Lower Bavaria, situated on the river Saltz. E. Long. 13. 25. N. Lat. 48. 5.

BURDEN, or **BURDON**, in music, the drone or bass, and the pipe or string which plays it: hence that part of a song, that is repeated at the end of every stanza, is called the *burden* of it.—A chord which is to be divided, to perform the intervals of music, when open and undivided, is also called the *burden*.

BURDEN of a Ship is its contents, or number of tons it will carry. The burden of a ship may be determined thus: Multiply the length of the keel, taken within board, by the breadth of the ship, within board, taken from the midship-beam, from plank to plank; and multiply the product by the depth of the hold, taken from the plank below the keelson, to the under part of the upper deck plank; and divide the last product by 95: the quotient is the content of the tonnage required. See FREIGHT.

BURDOCK, in botany. See **XANTHIUM**.

BURELL, or **CIVITA BURELLA**, a town of Italy in the kingdom of Naples, and in the Abruzzo Citra, near the river Sangro. E. Long. 15. 5. N. Lat. 41. 56.

BUREN, a town of the United Provinces, in Guelderland. It gives the title of count de Buren to the prince of Orange. E. Long. 5. 22. N. Lat. 52. 0.

BUREN, a town of Germany, in the circle of Westphalia, and bishopric of Paderborn. It is seated on the river Alme, five miles south of Paderborn. E. Long. 8. 25. N. Lat. 51. 35.

BURFORD, a town of Oxfordshire, seated on an ascent on the river Windrush, is a handsome place, chiefly noted for the making of saddles. The Downs near it, noted for horse-races, are of great advantage to

the town. It is 23 miles west-north-west of Banbury, and 85 west of London. W. Long. 1. 43. N. Lat. 51. 40.

BURG, a town of Lincolnshire, seated in a marsh, 12 miles south-east of Boston, and 127 north of London. E. Long. 0. 5. N. Lat. 53. 12.

BURG, a town of the Dutch Netherlands, in Zutphen, seated on the old Iffel, 18 miles east of Nimeguen. E. Long. 6. 12. N. Lat. 52. 0.

BURG-Castle, or *Borough-Castle*, a fortress on the edge of the county of Suffolk, three miles west of Yarmouth, where the rivers Yare and Waveny meet. It was formerly a delightful place; but now only the ruins of its walls remain, near which Roman coins are often dug up.

BURGAGE, or *Tenure in BURGAGE*, is where the king, or other person, is lord of an ancient borough, in which the tenements are held by a rent certain. It is indeed only a kind of town foccage; as common foccage †, by which other lands are holden, is usually of a rural nature. A borough is distinguished from other towns by the right of sending members to parliament; and where the right of election is by burgage-tenure, that alone is a proof of the antiquity of the borough. Tenure in burgage, therefore, or burgage-tenure, is where houses or lands which were formerly the site of houses in an ancient borough, are held of some lord in common foccage, by a certain established rent. And these seem to have withstood the shock of the Norman encroachments principally on account of their insignificance, which made it not worth while to compel them to an alteration of tenure, as 100 of them put together would scarce have amounted to a knight's fee. Besides, the owners of them, being chiefly artificers, and persons engaged in trade, could not with any tolerable propriety be put on such a military establishment, as the tenure in chivalry was. The free foccage, therefore, in which these tenements are held, seems to be plainly a remnant of Saxon liberty; which may also account for the great variety of customs, affecting many of these tenements so held in ancient burgage; the principal and most remarkable of which is that called *Borough-English*. See the article **BOUROUGH-English**.

BURGDORF, a handsome and pretty large town of Switzerland, in the canton of Bern, seated on an eminence. The river Emma is about a pistol's shot from the town; and as it often changes its bed, it frequently does a great deal of mischief. It runs at the foot of a rock of a prodigious height, and there is a stone-bridge over it. Near the town there is a sulphureous spring which supplies their baths with water, which is good against palsies and diseases of the nerves. E. Long. 7. 35. N. Lat. 47. 6.

BURGESS, an inhabitant of a borough, or one who possesses a tenement therein.

In other countries, burgess and citizen are confounded together; but with us they are distinguished. The word is also applied to the magistrates of some towns.

Burgess is now ordinarily used for the representative of a borough-town in parliament.

BURG-GRAVE properly denotes the hereditary governor of a castle or fortified town, chiefly in Germany.

BURGH. See **BOUROUGH**.

BURGH-Bote signifies a contribution towards the building or repairing of castles, or walls, for the defence

Burg
||
Borough.

† See Sec-
cage.

Burgh fence of a borough, or city.

By the law of king Athelstan, the castles and walls of towns were to be repaired, and burgh-bote levied every year within a fortnight after rogation days. No person whatever was exempt from this service; the king himself could not exempt a man from burgh-bote: yet, in after times, exemptions appear to have been frequently granted; inasmuch, that, according to Cowel, the word *burgh-bote* came to be chiefly used to denote not the service but the liberty or exemption from it.

BURGH-BRECH is properly the breaking open a burgh, house, inclosure, &c. and in the laws of Canute, c. 55. signifies a fine imposed upon a community of a town for a breach of the peace. According to Rastallus, burgh-breche is, to be quit of trespasses committed against the peace in city or borough.

BURGHMASTER, among mariners. See BARMASTER.

BURGHMOTE, the court of a borough. By the laws of king Edgar, the burghmote was to be held thrice in the year; by those of Henry I. 12 times.

BURG-LARY, or NOCTURNAL HOUSE-BREAKING, *burgi latrocinium*, which by the ancient English law was called *hamefucken*, as it is in Scotland to this day, has always been looked upon as a very heinous offence: not only because of the abundant terror it carries with it, but also as it is a forcible invasion and disturbance of that right of habitation which every individual might acquire even in a state of nature; an invasion, which, in such a state, would be sure to be punished with death, unless the assailant were stronger. But, in civil society, the laws come into the assistance of the weaker party: and, besides that they leave him his natural right of killing the aggressor if he can, they also protect and avenge him in case the assailant is too powerful. And the law has so particular and tender a regard to the immunity of a man's house, that it styles it his *castle*, and will never suffer it to be violated with impunity; agreeing herein with the sentiments of ancient Rome. For this reason no outward doors can in general be broken open to execute any civil process; tho' in criminal causes the public safety supercedes the private *. Hence also in part arises the animadversion of the law upon caves-droppers, nufancers, and incendiaries: and to this principle it must be assigned, that a man may assemble people together lawfully, (at least if they do not exceed 11), without danger of raising a riot, rout, or unlawful assembly, in order to protect his house; which he is not permitted to do in any other case.

The definition of a burglar, as given us by Sir Edward Coke, is, "he that by night breaketh and entereth into a mansion house, with intent to commit a felony." In this definition there are four things to be considered; the *time*, the *place*, the *manner*, and the *intent*.

1. The *time* must be by night, and not by day; for in the day-time there is no burglary; *i. e.* if there be day-light or crepusculum enough, begun or left, to discern a man's face withal. But this does not extend to moonlight; for then many midnight burglaries would go unpunished: and besides, the malignity of the offence does not consist so much in its being done in the dark, as at the dead of night; when all the creation, except beasts of prey, are at rest; when sleep has disarmed the

owner, and rendered his castle defenceless.

2. As to the *place*. It must be, according to Sir Edward Coke's definition, in a mansion-house: for no distant barn, warehouse, or the like, are under the same privileges, nor looked upon as a man's castle of defence; nor is a breaking open of houses wherein no man resides, and which for the time being are not mansion-houses, attended with the same circumstances of midnight terror. A house, however, wherein a man sometimes resides, and which the owner hath left only for a short season, *animo revertendi*, is the object of burglary, though no one be in it at the time of the fact committed. And if the barn, stable, or warehouse, be parcel of the mansion-house, though not under the same roof or contiguous, a burglary may be committed therein; for the capital house protects and privileges all its branches and appurtenants, if within the curtilage or homestead. A chamber in a college, or an inn of court, where each inhabitant hath a distinct property, is, to all other purposes as well as this, the mansion-house of the owner. So also is a room or lodging in any private house, the mansion for the time being of the lodger; if the owner doth not himself dwell in the house, or if he and the lodger enter by different outward doors. But if the owner himself lies in the house, and hath but one outward door at which he and his lodgers enter, such lodgers seem only to be inmates, and all their apartments to be parcel of the one dwelling-house of the owner.

3. As to the *manner* of committing burglary: there must be both a breaking and an entry to complete it. But they need not be both done at once; for, if a hole be broken one night, and the same breakers enter the next night through the same, they are burglars. There must be an actual breaking; as, at least, by breaking or taking out the glass of, or otherwise opening, a window; picking a lock, or opening it with a key; nay, by lifting up the latch of a door, or unloosing any other fastening which the owner has provided. But if a person leaves his doors or windows open, it is his own folly and negligence; and if a man enters therein it is no burglary; yet, if he afterwards unlocks an inner or chamber door, it is so. But to come down a chimney is held a burglarious entry; for that is as much clofed as the nature of things will permit. So also, to knock at a door, and upon opening it, to rush in with a felonious intent; or, under pretence of taking lodgings, to fall upon the landlord and rob him; or to procure a constable to gain admittance in order to search for traitors, and then to bind the constable and rob the house; all these entries have been adjudged burglarious, tho' there was no actual breaking: for the law will not suffer itself to be trifled with by such evasions, especially under the cloak of legal process. As for the *entry*, any the least degree of it, with any part of the body, or with an instrument held in the hand, is sufficient; as, to step over the threshold, to put a hand or hook in at a window to draw out goods, or a pistol to demand one's money, are all of them burglarious entries. The entry may be before the breaking, as well as after; for by statute 12 Anne, c. 7. if a person enters into the dwelling house of another, without breaking in either by day or by night, with an intent to commit felony, or, being in such house, shall commit any felony; and shall in the night break out of the same; this is declared

Burglary.

* See the article *Arrest*.

to be burglary.

4. As to the *intent*; it is clear that such breaking and entry must be with a felonious intent, otherwise it is only a trespass. And it is the same, whether such intention be actually carried into execution, or only demonstrated by some attempt or overt act, of which the jury is to judge.

Burglary is a felony at common law, but within the benefit of clergy. Burglary in any house belonging to the plate-glass company, with intent to steal the stock or utensils, is by statute 13 Geo. III. c. 38. declared to be single felony, and punished with transportation seven years.

BURGOMASTER, the chief magistrate of the great towns in Flanders, Holland, and Germany. The power and jurisdiction of the burgomaster is not the same in all places, every town having its particular customs and regulations: at Amsterdam there are four chosen by the voices of all those people in the senate who have either been burgomasters or echevins. Their authority resembles that of our lord-mayor and aldermen; they dispose of all under offices that fall in their time, keep the key of the bank, and enjoy a salary but of 500 guilders, all feasts, public entertainments, &c. being defrayed out of the common treasury.

BURGOS, a city of Spain, the capital of Old Castile, with an archbishop's see, erected in 1574. It is surrounded with mountains, which render the air very cold nine months in the year, and the other three excessive hot. It is seated on the declivity of a hill, on the top of which there is a strong castle, and the lower part of the town is watered by the river Alagon. The principal avenue to the city is by a handsome bridge over this river, which leads to a beautiful gate, adorned with the statues of several kings of Spain. The town is large and populous; but the houses are ill built, and the streets are narrow and dirty, except some few, especially that which leads to the cathedral. There are several squares, adorned with fountains and statues. The great square in the middle of the city is surrounded with fine houses, with piazzas to each. The cathedral church is a master-piece of Gothic architecture, and one of the finest in all Spain. The church of the Augustines is remarkable for its beautiful and rich chapel of the holy crucifix. There are several fine convents and nunneries; one of which last contains 150 nuns, who must all be of noble extraction. They have likewise a royal hospital, very richly endowed; and at this place they speak the best Castilian, that is, the purest Spanish in the kingdom. W. Long. 4. 7. N. Lat. 42. 20.

BURGUNDY, a province or government of France. It contains, besides the government of Burgundy, La Bresse, La Bugy, and the district of Gex; having Champagne on the north, Lyonnais on the south, Franche Comte on the east, and Nivernois and Bourbonnois on the west. Its length from north to south is about 45 leagues, and its breadth from east to west about 30. It is very fertile in corn, wine, fruit, and tobacco; being watered by the Seine, the Dehune which falls into the Soane, the Brebince or Bourbonce, the Armançon, the Oucke, and the Tille. There are some noted mineral springs in it, with subterraneous lakes, and plenty of ochre. For a long time it had dukes of its own, subordinate to the crown of France;

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but at last, Lew's XI. upon the failure of the heirs male, seized upon it, and annexed it to his crown. The whole government lies within the jurisdiction of the parliament of Burgundy, except a small part that is subject to that of Paris. The states meet regularly every three years, to raise the money required of them by the court. The principal places are Dijon, Auxerre, Autun, Bourbon, L'Ancy, &c.

BURIAL, the interment of a deceased person.

The rites of burial are looked upon in all countries, and at all times, as a debt so sacred, that such as neglected to discharge it were thought accursed: hence the Romans called them *jussa*, and the Greeks *νομιμα*, *δίκαια*, *δωρα*, words implying the inviolable obligations which nature has laid upon the living to take care of the obsequies of the dead. Nor are we to wonder, that the ancient Greeks and Romans were extremely solicitous about the interment of their deceased friends, since they were strongly persuaded, that their souls could not be admitted into the Elysian fields till their bodies were committed to the earth; and if it happened that they never obtained the rites of burial, they were excluded from the happy mansions for the term of 100 years. For this reason it was considered as a duty incumbent upon all travellers who should meet with a dead body in their way, to cast dust or mould upon it three times; and of these three handfuls, one at least was cast upon the head. The ancients likewise considered it as a great misfortune if they were not laid in the sepulchres of their fathers; for which reason, such as died in foreign countries had usually their ashes brought home, and interred with those of their ancestors. But notwithstanding their great care in the burial of the dead, there were some persons whom they thought unworthy of that last office, and to whom therefore, they refused it: such were, 1. Public or private enemies. 2. Such as betrayed, or conspired against their country. 3. Tyrants, who were always looked upon as enemies to their country. 4. Villains guilty of sacrilege. 5. Such as died in debt, whose bodies belonged to their creditors. And, 6. Some particular offenders, who suffered capital punishment.

Of those who were allowed the rites of burial, some were distinguished by particular circumstances of disgrace attending their interment: thus persons killed by lightning were buried apart by themselves, being thought odious to the gods; those who wasted their patrimony, forfeited the right of being buried in the sepulchres of their fathers; and those who were guilty of self-murder were privately deposited in the ground, without the accustomed solemnities. Among the Jews, the privilege of burial was denied only to self-murderers, who were thrown out to rot upon the ground. In the Christian church, though good men always desired the privilege of interment, yet they were not, like the heathens, so concerned for their bodies, as to think it any detriment to them, if either the barbarity of an enemy, or some other accident, deprived them of this privilege. The primitive Christian church denied the more solemn rites of burial only to unbaptized persons, self-murderers, and excommunicated persons who continued obdurate and impenitent, in a manifest contempt of the church's censures.

The place of burial among the Jews was never particularly determined. We find they had graves in the

Burick
||
Burkitt.

town and country, upon the highways, in gardens, and upon mountains. Among the Greeks, the temples were made repositories for the dead in the primitive ages; yet the general custom in latter ages, with them, as well as with the Romans and other heathen nations, was to bury their dead without their cities, and chiefly by the highways. Among the primitive Christians, burying in cities was not allowed for the first 300 years, nor in churches for many ages after, the dead bodies being first deposited in the atrium or church-yard, and porches and porticos of the church: hereditary burying-places were forbidden till the 12th century. As to the time of burial, with all the ceremonies accompanying it, see the article *FUNERAL-RITES*.

BURICK, a town of Germany, in the circle of Westphalia, and duchy of Cleves, subject to the king of Prussia. It was taken by the French in 1672, who demolished the fortifications. It is agreeably seated on the river Rhine, over against Wesel, in E. Long. 6. 8. N. Lat. 51. 38.

BURIDAN (John), a native of Bethune, in Artois, was one of the most celebrated philosophers of the 14th century. He taught in the university of Paris with great reputation; and wrote commentaries on logic, morality, and Aristotle's metaphysics. Avenarius relates, that he was a disciple of Ockam; and that, being expelled Paris by the power of the Realists, which was superior to that of the Nominalists, he went into Germany, where he founded the university of Vienna. From him came the proverb of the *ass of Buridan*, so famous in the schools. Buridan supposed an hungry ass fixed at an exactly equal distance between two bushels of oats; or an ass, as much pressed by thirst as hunger, between a bushel of oats and a pail of water, each of them acting equally on his senses. Having made this supposition, he desired to know what the ass would do? If he was answered that he would remain immovable, then he concluded he would die of hunger between two bushels of oats, or of both hunger and thirst, with both corn and water within his reach. This appeared absurd, and brought the laughers on his side; but if it was replied, that the ass would not be so stupid as to die of hunger or thirst in such a situation, Then (said he), the ass has free will, or it is possible that of two equal weights one should out-weigh the other? These two consequences appeared equally absurd; and thus Buridan, by this sophism, perplexed the philosophers, and his ass became famous in the schools.

BURKITT (William), a celebrated commentator on the New Testament, was born at Hitcham in Northamptonshire, July 25th 1650, and educated at Pembroke-hall, Cambridge. He entered young upon the ministry, being ordained by bishop Reynolds: and the first employment which he had was at Milden in Suffolk, where he continued 21 years a constant preacher, first as a curate, and afterwards as rector of that church. In the year 1692, he had a call to the vicarage of Dedham in Essex, where he continued to the time of his death, which happened in the latter end of October 1703. He was a pious and charitable man. He made great collections for the French Protestants in the years 1687, &c. and by his great care, pains, and charges, procured a worthy minister to go and settle in Carolina. Among other charities, by his last

will and testament, he bequeathed the house wherein he lived, with the lands thereunto belonging, to be an habitation for the lecturer that should be chosen from time to time, to read the lecture at Dedham. Besides his Commentary upon the New Testament, written in the same plain, practical, and affectionate manner in which he preached, he wrote a volume entitled *The poor man's help, and rich man's guide*.

BURLEIGH. See *CÆCIL*.

BURLESQUE, a species of composition, which, though a great engine of ridicule, is not confined to that subject; for it is clearly distinguishable into burlesque that excites laughter merely, and burlesque that excites derision or ridicule. A grave subject, in which there is no impropriety, may be brought down by a certain colouring so as to be risible, as in Virgil travestie; the author first laughs at every turn, in order to make his readers laugh. The Lutrin is a burlesque poem of the other sort, laying hold of a low and trifling incident to expose the luxury, indolence, and contentious spirit, of a set of monks. Boileau, the author, turns the subject into ridicule, by dressing it in the heroic style, and affecting to consider it as of the utmost dignity and importance. Though ridicule is the poet's aim, he always carries a grave face, and never once betrays a smile. The opposition between the subject and the manner of handling it, is what produces the ridicule; and therefore, in a composition of this kind, no image professedly ludicrous ought to have quarter, because such images destroy the contrast.

Though the burlesque that aims at ridicule, produces its effects by elevating the style far above the subject; yet the poet ought to confine himself to such images as are lively, and readily apprehended. A strained elevation, soaring above the ordinary reach of fancy, makes not a pleasant impression. The mind is soon disgusted by being kept long on the stretch. Machinery may be employed in a burlesque poem, such as the Lutrin, the Dispensary, or Hudibras, with more success and propriety than in any other species of poetry. For burlesque poems, though they assume the air of history, give entertainment chiefly by their pleasant and ludicrous pictures: it is not the aim of such a poem to raise sympathy; and for that reason, a strict imitation of nature is not necessary. And hence, the more extravagant the machinery in a ludicrous poem, the more entertainment it affords.

BURLINGTON, a sea-port town in the east riding of Yorkshire, situated on the German ocean, about 37 miles north-east of York. E. Long. 10. and N. Lat. 54. 15. It gives the title of *earl* to a branch of the noble family of Boyle.

New BURLINGTON, the capital of New-Jersey, in North America; situated in an island of Delaware river, about 20 miles north of Philadelphia. W. Long. 74. 0. and N. Lat. 40. 40.

BURMAN (Francis), a Protestant minister, and learned professor of divinity at Utrecht, was born at Leyden in 1628; and died on the 10th of November 1699, after having published a course of divinity, and several other works.

He is not to be confounded with *Francis Burman*, his son; or with *Peter Burman*, a laborious commentator on Phædrus, Lucan, Petronius, and other profane authors, who died in 1741.

BURN,

Burleigh
||
Burman.

BURN, in medicine and surgery, an injury received in any part of the body by fire. See SURGERY, § ix. 20.

BURNET (Gilbert), bishop of Salisbury in the latter end of the 16th century, was born at Edinburgh, in 1643, of an ancient family in the shire of Aberdeen. His father being bred to the law, was, at the restoration of king Charles II. appointed one of the lords of session, with the title of *lord Grimond*, in reward for his constant attachment to the royal party during the troubles of Great Britain. Our author, the youngest son of his father, was instructed by him in the Latin tongue: at ten years of age he was sent to continue his studies at Aberdeen, and was admitted M. A. before he was 14. His own inclination led him to the study of the civil and feudal law; and he used to say, that it was from this study he had received more just notions concerning the foundations of civil society and government, than those which some divines maintain. About a year after, he changed his mind, and began to apply to divinity, to the great satisfaction of his father. He was admitted preacher before he was 18; and Sir Alexander Burnet, his cousin-german, offered him a benefice; but he refused to accept of it.

In 1663, about two years after the death of his father, he came into England; and after six months stay at Oxford and Cambridge, returned to Scotland; which he soon left again to make a tour for some months in 1664, in Holland and France. At Amsterdam, by the help of a Jewish rabbi, he perfected himself in the Hebrew language; and likewise became acquainted with the leading men of the different persuasions tolerated in that country; as Calvinists, Arminians, Lutherans, Anabaptists, Brownists, Papists, and Unitarians, amongst each of which he used frequently to declare, he met with men of such unfeigned piety and virtue, that he became fixed in a strong principle of universal charity, and an invincible abhorrence of all severities on account of religious dissensions.

Upon his return from his travels, he was admitted minister of Salton; in which station he served five years in the most exemplary manner. He drew up a memorial, in which he took notice of the principal errors in the conduct of the Scots bishops, which he observed not to be conformable to the primitive institution; and sent a copy of it to several of them. This exposed him to their resentments: but, to shew he was not actuated with a spirit of ambition, he led a retired course of life for two years; which so endangered his health, that he was obliged to abate his excessive application to study. In 1669, he published his “*Modest and free conference between a conformist and non-conformist*.” He became acquainted with the dukes of Hamilton, who communicated to him all the papers belonging to her father and her uncle; upon which he drew up the “*Memoirs of the dukes of Hamilton*.” The duke of Lauderdale, hearing he was about this work, invited him to London, and introduced him to king Charles II. He returned to Scotland, and married the lady Margaret Kennedy, daughter of the earl of Cailes; a lady of great piety and knowledge, highly esteemed by the presbyterians, to whose sentiments she was strongly inclined. As there was some disparity in their ages, that it might remain past dispute that this match was wholly owing to inclination, and not to avarice or ambition, the day before their marriage our

author delivered the lady a deed, whereby he renounced all pretensions to her fortune, which was very considerable, and must otherwise have fallen into his hands, the herself having no intention to secure it. The same year he published his “*Vindication of the authority, constitution, and laws of the church and state of Scotland*,” which at that juncture was looked upon as so great a service, that he was again offered a bishopric, and a promise of the next vacant archbishopric; but did not accept of it, because he could not approve of the measures of the court, the grand view of which he saw to be the advancement of popery.

Mr Burnet's intimacy with the duke of Hamilton and Lauderdale occasioned him to be frequently fettered by the king and the duke of York, who had conversations with him in private. But Lauderdale conceiving a resentment against him on account of the freedom with which he spoke to him, represented at last to the king, that Dr Burnet was engaged in an opposition to his measures. Upon his return to London, he perceived that these suggestions had entirely thrown him out of the king's favour, though the duke of York treated him with greater civility than ever, and dissuaded him from going to Scotland. Upon this, he resigned his professorship at Glasgow, and staid at London. About this time the living at Cripple-gate being vacant, the dean and chapter of St Paul's (in whose gift it was), hearing of his circumstances, and the hardships he had undergone, sent him an offer of the benefice; but as he had been informed of their first intention of conferring it on Dr Fowler, he generously declined it. In 1675, at the recommendation of lord Hollis, whom he had known in France, ambassador at that court, he was by Sir Herbottle Grimstone, master of the rolls, appointed preacher of the chapel there, notwithstanding the opposition of the court. He was soon after chosen a lecturer of St Clement's, and became one of the preachers that were most followed in town. In 1697, he published his *History of the reformation*, for which he had the thanks of both houses of parliament. The first part of it was published in 1679, and the second in 1681. Next year he published an abridgement of these two parts.

Mr Burnet about this time happened to be sent for to a woman in sickness, who had been engaged in an amour with the earl of Rochester. The manner in which he treated her during her illness, gave that lord a great curiosity for being acquainted with him. Whereupon, for a whole winter, he spent one evening in a week with Dr Burnet, who discoursed with him upon all those topics upon which sceptics and men of loose morals attack the Christian religion. The happy effect of these conferences occasioned the publication of his account of the life and death of that earl. In 1682, when the administration was changed in favour of the duke of York, being much resorted to by persons of all ranks and parties, in order to avoid returning visits, he built a laboratory, and went for above a year thro' a course of chemical experiments. Not long after, he refused a living of 300 *l.* a-year, offered him by the earl of Essex on the terms of his not residing there but in London. When the inquiry concerning the Popish plot was on foot, he was frequently sent for and consulted by king Charles with relation to the state of the nation. His majesty offered him the bishopric of Chichester,

then vacant, if he would engage in his interests; but he refused to accept it on these terms. He preached at the Rolls till 1684, when he was dismissed by order of the court. About this time he published several pieces.

On king James's accession to the throne, having obtained leave to go out of the kingdom, he first went to Paris, and lived in great retirement, till contracting an acquaintance with brigadier Stoupe, a Protestant gentleman in the French service, he made a tour with him into Italy. He met with an agreeable reception at Rome. Pope Innocent II. hearing of our author's arrival, sent the captain of the Swiss guards to acquaint him he would give him a private audience in bed, to avoid the ceremony of kissing his holiness's slipper. But Dr Burnet excused himself as well as he could. Some disputes which our author had here concerning religion, beginning to be taken notice of, made it proper for him to quit the city; which, upon an intimation given him by prince Borghese, he accordingly did.

He pursued his travels thro' Switzerland and Germany. In 1688, he came to Utrecht, with an intention to settle in some of the seven provinces. There he received an invitation from the prince and princeps of Orange (to whom their party in England had recommended him) to come to the Hague, which he accepted. He was soon made acquainted with the secret of their counsels, and advised the fitting out of a fleet in Holland sufficient to support their designs and encourage their friends. This, and the *Account of his travels*, in which he endeavoured to blend Popery and tyranny together, and represent them as inseparable, with some papers reflecting on the proceedings of England, that came out in single sheets, and were dispersed in several parts of England, most of which Mr Burnet owned himself the author of, alarmed king James; and were the occasion of his writing twice against him to the princeps of Orange, and insulting, by his ambassador, on his being forbid the court; which after much importunity was done, tho' he continued to be trusted and employed as before, the Dutch minister consulting him daily. To put an end to these frequent conferences with the ministers, a prosecution for high treason was set on foot against him both in England and Scotland. But Burnet receiving the news thereof before it arrived at the States, he avoided the storm, by petitioning for, and obtaining without any difficulty, a bill of naturalization, in order to his intended marriage with Mary Scot, a Dutch lady of considerable fortune, who, with the advantage of birth, had those of a fine person and understanding.

After his marriage with this lady, being legally under the protection of Holland, when Mr Burnet found king James plainly subverting the constitution, he omitted no method to support and promote the design the Prince of Orange had formed of delivering Great Britain, and came over with him in quality of chaplain. He was soon advanced to the see of Salisbury. He declared for moderate measures with regard to the clergy who scrupled to take the oaths, and many were displeased with him for declaring for the toleration of non-conformists. His pastoral letter concerning the oaths of allegiance and supremacy to king William and queen Mary, 1689, happening to touch upon the right of conquest, gave such offence to both houses of parlia-

ment, that it was ordered to be burnt by the hands of the common executioner. In 1698 he lost his wife by the small-pox; and, as he was almost immediately after appointed preceptor to the duke of Gloucester, in whose education he took great care, this employment, and the tender age of his children, induced him the same year to supply her loss by a marriage with Mrs Berkeley, eldest daughter of Sir Richard Blake, knight. In 1699 he published his "Explication of the 39 articles;" which occasioned a representation against him in the lower house of convocation in the year 1701; but he was vindicated by the upper house. His speech in the house of lords in 1704 against the bill to prevent occasional conformity was severely attacked. He died in 1715, and was interred in the church of St James, Clerkenwell, where he has a monument erected to him. He formed a scheme for augmenting the poor livings; which he pressed forward with such success, that it ended in an act of parliament passed in the 2^d year of queen Anne, "for the augmentation of the livings of the poor clergy."

BURNET (Thomas), a polite and learned writer in the end of the 17th century, was born in Scotland, but educated in Cambridge under the tuition of Mr John Tillotson, afterwards archbishop of Canterbury. In the beginning of 1685, he was made master of Sutton's hospital in London, after which he entered into holy orders. During the reign of king James, he made a noble stand in his post as master of the charter-house against the encroachments of that monarch, who would have imposed one Andrew Popham, a Papist, as a pensioner upon the foundation of that house. In 1680 he published his *Telluris theoria sacra*, so universally admired for the purity of the style and beauty of the sentiments, that king Charles gave encouragement to a translation of it into English. This theory was however attacked by several writers. In 1692 he published his *Archeologie philosophice*, dedicated to king William, to whom he was clerk of the closet. He died in 1715. Since his death hath been published, his book *De statu mortuorum et resurgentium*, and his treatise *De fide et officiis Christianorum*.

BURNET, in botany. See POTERIUM and SANGUISORBA.

BURNHAM, a market town of Norfolk in England, situated in E. Long. o. 50. N. Lat. 53. o.

BURNING, the action of fire on some pabulum or fuel, by which the minute parts thereof are put into a violent motion, and some of them assuming the nature of fire themselves, fly off in *orbem*, while the rest are dissipated in form of vapour, or reduced to ashes *.

Extraordinary Cases of BURNING. We have instances of persons burnt by fire kindled within their own bodies. A woman at Paris, who used to drink brandy to excess, was one night reduced to ashes by a fire from within, all but her head and the ends of her fingers. Signora Corn. Zangari, or, as others call her, *Corn. Bandi*, an aged lady, of an unblemished life, near Cesena in Romagna, underwent the same fate in March 1731. She had retired in the evening into her chamber somewhat indisposed; and in the morning was found in the middle of the room reduced to ashes, all except her face, legs, skull, and three fingers. The stockings and shoes she had on were not burnt in the least. The ashes were light; and, on pressing between the fingers, vanished,

Burning. vanished, leaving behind a gross stinking moisture, with which the floor was smeared; the walls and furniture of the room being covered with a moist cineritious foot, which had not only stained the linen in the chests, but had penetrated into the closet, as well as into the room overhead, the walls of which were moistened with the same viscous humour.—We have various other relations of persons burnt to death in this unaccountable manner.

Sig. Mondini, Bianchini, and Maffei, have written treatises expressly to account for the cause of so extraordinary an event: common fire it could not be, since this would likewise have burnt the bed and the room; besides that it would have required many hours, and a vast quantity of fuel, to reduce a human body to ashes; and, after all, a considerable part of the bones would have remained entire, as they were anciently found after the fiercest funeral fires. Some attribute the effect to a mine of sulphur under the house; others, to a miracle; while others suspect that art or villainy had a hand in it. A philosopher of Verona maintains, that such a conflagration might have arisen from the inflammable matters where-with the human body naturally abounds. Sig. Bianchini accounts for the conflagration of the lady above mentioned, from her using a bath or lotion of camphorated spirit of wine when she found herself out of order. Maffei supposes it owing to lightning, but to lightning generated in her own body, agreeable to his doctrine, which is, That lightning does not proceed from the clouds, but is always produced in the place where it is seen and its effects perceived. We have had a late attempt to establish the opinion, that these destroying internal fires are caused in the entrails of the body by inflamed effluvia of the blood; by juices and fermentations in the stomach; by the many combustible matters which abound in living bodies for the purposes of life; and, finally, by the fiery evaporations which exhale from the settlings of spirit of wine, brandies, and other hot liquors, in the tunica villosa of the stomach and other adipose or fat membranes; within which those spirits engender a kind of camphor, which in the night-time, in sleep, by a full respiration, are put in a stronger motion, and are more apt to be set on fire. Others ascribe the cause of such persons being set on fire to lightning; and their burning so entirely, to the greater quantity of phosphorus and other combustible matter they contained.—For our own part, we can by no means pretend to explain the cause of such a phenomenon: but for the interests of humanity we wish it could be derived from something external to the human body; for if, to the calamities of human life already known, we superadd a suspicion that we may unexpectedly and without the least warning be consumed by an internal fire, the thought is too dreadful to be borne.

BURNING, or *Brenning*, in our old customs, denotes an infectious disease, got in the stews by conversing with lewd women, and supposed to be the same with what we now call the *venerical disease*.

In a manuscript of the vocation of John Bale to the bishopric of Ossory, written by himself, he speaks of Dr Hugh Weston, who was dean of Windsor in 1556, but deprived by cardinal Pole for adultery, thus: “At this day is lecherous Weston, who is more practised in the arts of breach-burning, than all the whores of the stews. He not long ago brent a beggar of St Botolph’s

parish.” See STREWS.

BURNING, in antiquity, a way of disposing of the dead much practised by the ancient Greeks and Romans, and still retained by several nations in the East and West Indies. The antiquity of this custom rises as high as the Theban war, where we are told of the great solemnity accompanying this ceremony at the pyre of Menæceus and Archemorus, who were contemporary with Jair the eighth judge of Israel. Homer abounds with funeral obsequies of this nature. In the inward regions of Asia, the practice was of very ancient date, and the continuance long: for we are told, that, in the reign of Julian, the king of Chionia burnt his son’s body, and deposited the ashes in a silver urn. Coeval almost with the first influences of this kind in the east, was the practice in the western parts of the world. The Herulians, the Getes, and the Thracians, had all along observed it; and its antiquity was as great with the Celts, Sarmatians, and other neighbouring nations. The origin of this custom seems to have been out of friendship to the deceased: their ashes were preserved as we preserve a lock of hair, a ring, or a seal, which had been the property of a deceased friend.

Kings were burnt in cloth made of the asbestos stone, that their ashes might be preserved pure from any mixture with the fuel and other matters thrown on the funeral pile. The same method is still observed with the princes of Tartary. Among the Greeks, the body was placed on the top of a pile, on which were thrown divers animals, and even slaves and captives, besides unguents and perfumes. In the funeral of Patroclus we find a number of sheep and oxen thrown in, then four horses, followed by two dogs, and lastly by 12 Trojan prisoners. The like is mentioned by Virgil in the funerals of his Trojans; where, besides oxen, swine, and all manner of cattle, we find eight youths condemned to the flames. The first thing was the fat of the beasts wherewith the body was covered, that it might consume the sooner; it being reckoned great felicity to be quickly reduced to ashes. For the like reason, where numbers were to be burnt at the same time, care was taken to mix with the rest some of humid constitutions, and therefore more easily to be inflamed. Thus we are assured by Plutarch and Macrobius, that for every ten men it was customary to put in one woman. Soldiers usually had their arms burnt with them. The garments worn by the living were also thrown on the pile, with other ornaments and presents; a piece of extravagance which the Athenians carried to so great a height, that some of their law-givers were forced to restrain them, by severe penalties, from defrauding the living by their liberality to the dead.—In some cases, burning was expressly forbid among the Romans, and even looked upon as the highest impicty. Thus infants, who died before the breeding of teeth, were intombed unburnt in the ground, in a particular place set apart for this purpose, called *suggrundarium*. The like was practised with regard to those who had been struck dead with lightning, who were never to be burnt again. Some say that burning was denied to suicides.—The manner of burning among the Romans was not unlike that of the Greeks: the corpse, being brought out without the city, was carried directly to the place appointed for burning it; which, if it joined to the sepulchre, was called *burnum*; if separate from it, *ustrina*; and there

laid

Burning.

Burning.

laid on the *rogus* or *pyra*, a pile of wood prepared on which to burn it, built in shape of an altar, but of different height according to the quality of the deceased. The wood used was commonly from such trees as contained most pitch or resin; and if any other were used, they split it for the more easy catching fire: round the pile they set cypress trees, probably to hinder the noisome smell of the corpse. The body was not placed on the bare pile, but on the couch or bed whereon it lay. This done, the next of blood performed the ceremony of lighting the pile; which they did with a torch, turning their face all the while the other way, as if it were done with reluctance. During the ceremony, decursions and games were celebrated; after which came the *offitium*, or gathering of the bones and ashes; also washing and anointing them, and repositing them in urns.

BURNING, among surgeons, denotes the application of an actual cautery, that is, a red-hot iron instrument, to the part affected; otherwise denominated *cauterization*.—The whole art of physic among the Japanese lies in the choice of places proper to be burnt; which are varied according to the disease. In the country of the Mogul, the colic is cured by an iron ring applied red-hot about the patient's navel. Certain it is, that some very extraordinary cures have been performed accidentally by burning. The following case is recorded in the Memoirs of the academy of sciences by M. Homberg. A woman of about 35 became subject to a headache, which at times was so violent, that it drove her out of her senses, making her sometimes stupid and foolish, at other times raving and furious. The seat of the pain was in the forehead, and over the eyes, which were inflamed, and looked violently red and sparkling; and the most violent fits of it were attended with nausea and vomitings. In the times of the fits, she could take no food; but, out of them, had a very good stomach. Mr Homberg had in vain attempted her cure for three years with all kinds of medicines: only opium succeeded; and that but little, all its effect being only the taking off the pain for a few hours. The redness of her eyes was always the sign of an approaching fit. One night, feeling a fit coming on, she went to lie down upon the bed; but first walked up to the glass with the candle in her hand, to see how her eyes looked: in observing this, the candle set fire to her cap; and as she was alone, her head was terribly burnt before the fire could be extinguished. Mr Homberg was sent for, and ordered bleeding and proper dressings: but it was perceived, that the expected fit this night never came on; the pain of the burning wore off by degrees; and the patient found herself from that hour cured of the head-ach, which had never returned in four years after, which was the time when the account was communicated.—Another case, not less remarkable than the former, was communicated to Mr Homberg by a physician at Bruges. A woman, who for several years had her legs and thighs swelled in an extraordinary manner, found some relief from rubbing them before the fire with brandy every morning and evening. One evening the fire chanced to catch the brandy she had rubbed herself with, and slightly burnt her. She applied some brandy to her burn; and in the night all the water her legs and thighs were swelled with was entirely discharged by urine, and the swelling did not again return.

Burning.

BURNING-Glass, a convex glass commonly spherical, which being exposed directly to the sun, collects all the rays falling thereon into a very small space called the *focus*; where wood, or any other combustible matter being put, will be set on fire. The term *burning-glass* is also used to denote those concave mirrors, whether composed of glass quick-silvered, or of metalline matters, which burn by reflection, condensing the sun's rays into a focus similar to the former.

The use of burning-glasses appears to have been very ancient. Diodorus Siculus, Lucian, Dion, Zonaras, Galen, Anthemius, Eustathius, Tetztes, and others, attest, that by means of them Archimedes set fire to the Roman fleet at the siege of Syracuse. Tetztes is so particular in his account of this matter, that his description suggested to Kircher the method by which it was probably accomplished. That author says, that "Archimedes set fire to Marcellus's navy, by means of a burning-glass composed of small square mirrors, moving every way upon hinges; which, when placed in the sun's rays, directed them upon the Roman fleet, so as to reduce it to ashes at the distance of a bow-shot." A very particular testimony we have also from Anthemius of Lydia, who takes pains to prove the possibility of setting fire to a fleet, or any other combustible body, at such a distance.

That the ancients were also acquainted with the use of catoptric or refracting burning-glasses, appears from a passage in Aristophanes's comedy of the clouds, which clearly treats of their effects. The author introduces Socrates as examining Strepsiades about the method he had discovered of getting clear of his debts. He replies, that "he thought of making use of a burning-glass which he had hitherto used in kindling his fire;" "for, (says he), should they bring a writ against me, I'll immediately place my glass in the sun at some little distance from it, and set it on fire." Pliny and Lactantius have also spoken of glasses that burned by refraction. The former calls them *balls* or *globes of glass* or *crystal*, which, exposed to the sun, transmit a heat sufficient to set fire to cloth, or corrode away the dead flesh of those patients who stand in need of caustics; and the latter, after Clemens Alexandrinus, takes notice that fire may be kindled by interposing glasses filled with water between the sun and the object, so as to transmit the rays to it.

It seems difficult to conceive how they should know such glasses would burn without knowing they would magnify, which it is granted they did not, till towards the close of the 13th century, when spectacles were first thought on. For as to those passages in Plautus which seem to intimate the knowledge of spectacles, M. de la Hire observes, they do not prove any such thing; and he solves this, by observing, that their burning-glasses being spheres, either solid or full of water, their foci would be one fourth of their diameter distant from them. If then their diameter were supposed half a foot, which is the most we can allow, an object must be at an inch and a half distance to perceive it magnified; those at greater distances do not appear greater, but only more confused through the glass than out of it. It is no wonder, therefore, the magnifying property of convex glasses was unknown, and the burning one known. It is more wonderful there should be 300 years between the invention of spectacles and telescopes.

Burning. scopes.

Among the ancients, the burning mirrors of Archimedes and Proclus are famous : the former we have already taken notice of ; by the other, the navy of Vitellius besieging Byzantium, according to Zonaras, was burnt to ashes.

Among the moderns, the most remarkable burning mirrors are those of Settala, of Villette, of Tschirnhausen, and M. Buffon. Settala, canon of Padua, made a parabolic mirror, which, according to Schottus, burnt pieces of wood at the distance of 15 or 16 paces.

M. Tschirnhausen's mirror at least equals the former, both in bigness and effect. The following things are noted of it in the *Acta Eruditorum*. 1. Green wood takes fire instantaneously, so as a strong wind cannot extinguish it. 2. Water boils immediately ; and eggs in it are presently edible. 3. A mixture of tin and lead, three inches thick, drops presently ; and iron and steel-plate becomes red-hot presently, and a little after burns into holes. 4. Things not capable of melting, as stones, bricks, &c. become soon red-hot, like iron. 5. Slate becomes first white, then a black glass. 6. Tiles are converted into a yellow glass, and shells into a blackish yellow one. 7. A pumice stone, emitted from a volcano, melts in white glass ; and, 8. A piece of crucible also vitrifies in eight minutes. 9. Bones are soon turned into an opaque glass, and earth into a black one. The breadth of this mirror is near three Leipzig ells, its focus two ells from it ; it is made of copper, and its substance is not above double the thickness of the back of a knife.

Villette, a French artist of Lyons, made a large mirror, which was bought by Tavernier, and presented to the king of Persia ; a second, bought by the king of Denmark ; a third presented by the French king to the royal academy ; a fourth has been in England, where it was publicly exposed. The effect hereof, as found by Dr Harris and Dr Desaguliers, are, that a silver sponex is melted in 7" and $\frac{1}{2}$, a king George's halfpenny in 16", and runs with a hole in 34". Tin melts in 3", cast-iron in 16", slate in 3" ; a fossil shell calcines in 7" ; a piece of Pompey's pillar at Alexandria vitrifies in the black part in 50", in the white in 54" ; copper ore in 8" ; bone calcines in 4", vitrifies in 33". An emerald melts into a substance like a turquoise stone ; a diamond weighing four grains loses $\frac{1}{2}$ of its weight : the asbestos vitrifies ; as all other bodies will do, if kept long enough in the focus ; but when once vitrified, the mirror can go no farther with them. This mirror is 47 inches wide, and is ground to a sphere of 76 inches radius ; so that its focus is about 38 inches from the vertex. Its substance is a composition of tin, copper, and tin-glass.

Every lens, whether convex, plano-convex, or convexo-convex, collects the sun's rays, dispersed over its convexity, into a point by refraction ; and is therefore a burning-glass. The most considerable of this kind is that made by M. de Tschirnhausen : the diameter of his lens is three and four feet, the focus at the distance of 12 feet, and its diameter an inch and a half. To make the focus the more vivid, it is collected a second time by a second lens parallel to the first, and placed in that point where the diameter of the cone of rays formed by the first lens is equal to the diameter

of the second ; so that it receives them all ; and the focus, from an inch and a half, is contracted into the space of eight lines, and its force increased proportionably.

This glass vitrifies tiles, slates, pumice-stones, &c. in a moment. It melts sulphur, pitch, and all resins, under water ; the ashes of vegetables, woods, and other matters, are transmuted into glass ; and every thing applied to its focus, is either melted, turned into a calx, or into smoke. Tschirnhausen observes, that it succeeds best when the matter applied is laid on a hard charcoal well burnt.

Sir Isaac Newton presented a burning-glass to the royal society, consisting of seven concave glasses, so placed, as that all their foci join in one physical point. Each glass is about 11 inches and a half in diameter : six of them are placed round the seventh, to which they are all contiguous ; and they form a kind of segment of a sphere, whose subtense is about 34 inches and a half, and the central glass lies about an inch farther in than the rest. The common focus is about 22 inches and a half distant, and about an inch in diameter. This glass vitrifies brick or tile in 1", and melts gold in 30".

It would appear, however, that glass quicksilvered is a more proper material for burning-glasses than metals ; for the effects of that speculum wherewith Mr Macquer melted the platina, seem to have been superior to those above mentioned, though the mirror itself was much smaller. The diameter of this glass was only 22 inches, and its focal distance 28. Black flint, when exposed to the focus, being powdered to prevent its crackling and flying about, and secured in a large piece of charcoal, bubbled up, and ran into transparent glass in less than half a minute. Hessian crucibles, and glass-house pots, vitrified completely in three or four seconds. Forged iron smoked, boiled, and changed into a vitrescent scoria as soon as it was exposed to the focus. The gypsum of Montmartre, when the flat sides of the plates or leaves of which it is composed were presented to the glass, did not show the least disposition to melt ; but, on presenting a transverse section of it, or the edges of the plates, it melted in an instant, with a hissing noise, into a brownish yellow matter. Calcareous stones did not completely melt : but there was detached from them, a circle more compact than the rest of the mass, and of the size of the focus ; the separation of which seemed to be occasioned by the shrinking of the matter which had begun to enter into fusion. The white calx of antimony commonly called *diaphoretic antimony*, melted better than the calcareous stones, and changed into an opaque pretty glossy substance like white enamel. It was observed, that the whiteness of the calcareous stones and the antimonial calx was of great disadvantage to their fusion, by reason of their reflecting great part of the sun's rays ; so that the subject could not undergo the full activity of the heat thrown upon it by the burning-glass. The case was the same with metallic bodies, which melted so much the more difficultly as they were more white and polished ; and this difference was so remarkable, that in the focus of this mirror, so fusible a metal as silver, when its surface was polished, did not melt at all.

Plate LXVI. fig. 3. represents Mr Buffon's burning mirror, which he with great reason supposes to be

Burning.

Burning.

of the same nature with that of Archimedes. It consists of a number of small mirrors of glass quicksilvered, all of which are held together by an iron frame. Each of these small mirrors is also moveable by a contrivance on the back part of the frame, that so their reflections may all coincide in one point. By this means they are capable of being accommodated to various heights of the sun, and to different distances. The adjusting them in this manner takes up a considerable time; but after they are so adjusted, the focus will continue unaltered for an hour or more.

Fig. 4. represents a contrivance of M. Buffon's for diminishing the thickness of very large reflecting lenses. He observes, that in large lenses of this kind, and which are most convenient for many purposes, the thickness of the glass in the middle is so great, as very much to diminish their force. For this reason he proposes to form a burning-glass of concentric circular pieces of glass, each resting upon the other, as represented in the figure. His method is to divide the convex arch of the lens into three equal parts. Thus, suppose the diameter to be 26 inches, and the thickness in the middle to be three inches: By dividing the lens into three concentric circles, and laying the one over the other, the thickness of the middle piece needs be only one inch; at the same time that the lens will have the same convexity, and almost the same focal distance, as in the other case; while the effects of it must be much greater, on account of the greater thinness of the glass.

BURNING Springs. Of these there are many in different parts of the world; particularly one in Dauphiny near Grenoble; another near Hermanstadt in Transylvania; a third at Chermay, a village near Switzerland; a fourth in the canton of Friburg; and a fifth not far from the city of Cracow in Poland. There also is, or was, a famous spring of the same kind at Wigan in Lancashire, which, upon the approach of a lighted candle, would take fire and burn like spirit of wine for a whole day. But the most remarkable one of this kind, or at least that of which we have the most particular description, was discovered in 1711 at Broseley in Shropshire. The following account of this remarkable spring was given by the reverend Mr Mason Woodwardian professor at Cambridge, dated February 18th 1746. "The well for four or five feet deep is six or seven feet wide; within that is another less hole of like depth dug in the clay, in the bottom whereof is placed a cylindric earthen vessel, of about four or five inches diameter at the mouth, having the bottom taken off and the sides well fixed in the clay rammed close about it. Within the pot is a brown water thick as puddle, continually forced up with a violent motion beyond that of boiling water, and a rumbling hollow noise, rising or falling by fifts five or six inches; but there was no appearance of any vapour rising, which perhaps might have been visible, had not the sun shone so bright. "Upon putting a candle down at the end of a stick, at about a quarter of a yard distance, it took fire, darting and flashing after a very violent manner for about half a yard high, much in the manner of spirits in a lamp, but with great agitation. It was said, that a tea-kettle had been made to boil in about nine minutes time, and that it had been left burning for 48 hours without any sensible diminution. It

was extinguished by putting a wet mop upon it; which must be kept there for a little time, otherwise it would not go out. Upon the removal of the mop there rises a sulphureous smoke lasting about a minute, and yet the water is very cold to the touch." In 1755, this well totally disappeared by the sinking of a coal-pit in its neighbourhood.

The cause of the inflammable property of such waters, is with great probability supposed to be their mixture with petroleum, which is one of the most inflammable substances in nature, and has the property of burning on the surface of water.

BURNING of Colours, among painters. There are several colours that require burning; as,

First, lamp-black, which is a colour of so greasy a nature, that, except it is burnt, it will require a long time to dry. The method of burning, or rather drying, lamp-black, is as follows: Put it into a crucible over a clear fire, letting it remain till it be red hot, or so near it that there is no manner of smoke arises from it.

Secondly, Umber, which if it be intended for colour for a horse, or to be a shadow for gold, then burning fits it for both these purposes. In order to burn umber, you must put it into the naked fire, in large lumps, and not take it out till it is thoroughly red hot; if you have a mind to be more curious, put it into a crucible, and keep it over the fire till it be red hot.

Ivory also must be burnt to make black; thus: fill two crucibles with shavings of ivory, then clap their two mouths together, and bind them fast with an iron wire, and lute the joints close with clay, salt, and horse-dung, well beaten together; then set it over the fire, covering it all over with coals: let it remain in the fire, till you are sure that the matter inclosed is thoroughly red hot: then take it out of the fire; but do not open the crucibles till they are perfectly cold; for were they opened while hot, the matter would turn to ashes; and so it will be, if the joints are not luted close.

BURNISHER, a round polished piece of steel, serving to smooth and give a lustre to metals.

Of these there are different kinds of different figures, straight, crooked, &c. Half burnishers are used to solder silver, as well as to give a lustre to.

BURNISHING, the art of smoothing or polishing a metalline body, by a brisk rubbing of it with a burnisher.

Book-binders burnish the edges of their books, by rubbing them with a dog's tooth. Gold and silver are burnished by rubbing them with a woof's tooth, or by the bloody stone, or by tripoli, a piece of white wood, emery, and the like. Deer are said to burnish their heads, by rubbing off a downy white skin from their horns, against a tree.

BURNLEY, a town of Lancashire in England, situated in W. Long. 2. 5. N. Lat. 53. 40.

BURNTISLAND. See BRUNTSISLAND.

BURNTWOOD, a town of Essex in England, situated on a hill, in E. Long. o. 25. N. Lat. 51. 38.

BURR, the round knob of a horn next a deer's head.

BURRE, BOUREE, or Boree, a kind of dance composed of three steps joined together in two motions, begun with a crotchet rising. The first couplet contains

Burning
||
Burntwood.

† See Solder.

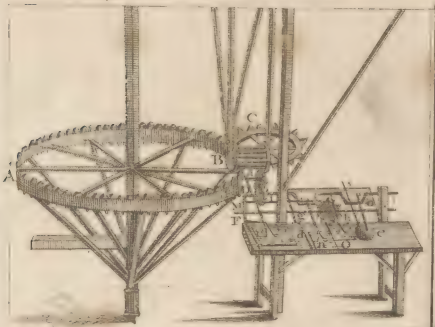


Fig. 6.

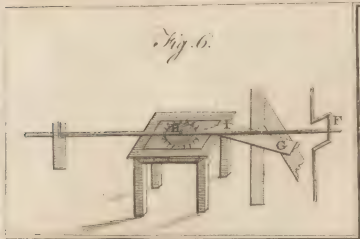


Fig. 4. BURNING Mirror with elevations.



Fig. 2. BULLA or Snapper.

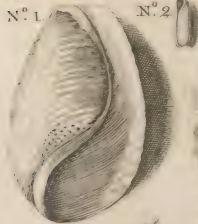


Fig. 1. BUCCEINUM LUPULINUS or British Purple Shell.





tains twice four measures, the second twice eight. It consists of a balance and coupee.

BURR-PUMP, or **BIDGE-Pump**, differs from the common pump, in having a staff 6, 7, or 8 feet long, with a bar of wood, whereto the leather is nailed, and this serves instead of a box. So two men, standing over the pump, thrust down this staff, to the middle wherof is fastened a rope, for 6, 8, or 10 to hale by, thus pulling it up and down.

BURROCK, a small wrier or dam, where wheels are laid in a river, for the taking of fish.

BURROUGHS'S MACHINE, invented by Mr Burroughs of Southwark; and for which the society for the encouragement of arts gave him a premium of 70 l.

Pl. LXVI.

This machine consists of a cog-wheel A (fig. 5.), 12 feet in diameter, carrying 72 cogs; which turn a trundle-head B, one foot four inches in diameter, and furnished with eight rounds; and also an horizontal spur-wheel C, of 12 cogs, and one foot eight inches in diameter. The trundle-head B turns a spur-wheel D of ten cogs, and two feet eight inches in diameter. This spur-wheel has two cranks, *a, b*, in its shaft; one of which *a* gives motion to a wooden frame, *c*, about 34 inches long, and 19 broad. On the under side of this frame are fastened by screws twelve pieces of polished metal, each five inches and a half long, and three broad, covered with leather; and underneath these polishers, a glass plate cemented in another frame is placed on the bench *d*, and polished with tripoli by the motion given to the upper frame by the crank *a*. The nuts of the screws which fasten the polishers to the upper frame are not screwed close to the wood, in order to give the frame room to play; by which contrivance the perpendicular rise of the crank is avoided, and the motion of the polishers always parallel and equal. The under frame may be moved by the hand in any direction without stopping the machine; by which means the plate, when larger than the polishing frame can cover in its motion, will be equally polished in every part.

The other crank *b* gives motion to two other polishers marked *n, o*, which have an alternate motion by the bending of the crank; they move upon the same plate, and have an equal number of polishers, as that already described.

The same crank also gives motion to a contrivance represented at *e* for polishing spectacle-glasses. It consists of two segments of the same sphere; one concave, and the other convex. On the latter the glasses are cemented; and polished by the former, which is moved by the crank *b*. The convex segment may be moved round by the hand without stopping the machine, so that all the glasses on its superficies will be equally polished.

The other spur-wheel C, by means of a crank in its shaft, gives motion to another frame *g*, employed in grinding the glass plates. The rod *h*, extended from the crank *f* to the frame *g*, is fastened to the latter by means of a pivot, in order to admit of a rotatory motion, as well as that given it by the crank in a longitudinal direction. This rotatory motion is effected by means of a rod of iron *i*, called a *trigger*, sharp at the extremity next the frame, where it touches the teeth of an horizontal spur-wheel, or circular piece of wood, fixed on the grinding-plate, while the other end is ex-

tended three feet two inches to the centre of motion.

But this contrivance, in which the merit of the machine principally consists, will be much better conceived from a small delineation of it by itself (fig. 6.), where F is the crank marked *f* in fig. 5. and turned by the spur-wheel C in the same figure. G is the trigger, three feet two inches long. I, a roll fixed on the trigger for the rod to slide on. H, the horizontal spur-wheel, eleven inches in diameter, fixed on the grinding-plate; the teeth of which is touched by the trigger; but with a very unequal force, as it will wholly depend upon the grinding plate's being farther from, or nearer to, the centre of motion of the trigger. By this simple contrivance, the grinding-plate has a very compound motion, never moving exactly in the same tract, and therefore must grind the plates equally in every part. Several attempts have been made by others for producing the same effect: but without success; the grinding-plate always following the same tract, and consequently the plates were ground unequally.

BURROWS, holes in a warren, serving as a covert for rabbits, &c. A coney's coming out of her burrow is called *bolting*. To catch coney, they sometimes lay purse-nets over the burrows, then put in a terrier close muzzled, which making the creature bolt, she is caught in the net.

BURSA, or **PRUSA**, in geography, the capital of Bithinia in Asia Minor, situated in a fine fruitful plain, at the foot of mount Olympus, about 100 miles south of Constantinople. E. Long. 29. o. N. Lat. 40. 30.

BURSA-Pasoris, in botany. See *THLASPI*.

BURSA, *Burse*, originally signifies a purse. In middle-age writers it is more particularly used for a little college or hall in an university, for the residence of students called *burfules* or *burfarii*. In the French universities it still denotes a foundation for the maintenance of poor scholars in their studies. The nomination to burles is in the hands of the patrons and founders thereof. The burles of colleges are not benefices, but mere places assigned to certain countries and persons. A burse becomes vacant by the burser's being promoted to a cure.

BURSAR, or **BURSER**, (*Burfarius*), is used in middle-age writers for a treasurer or cash-keeper. In this sense we meet with burfars of colleges. Conventual burfars were officers in monasteries, who were to deliver up their account yearly on the day after Michaelmas. The word is formed from the Latin *burfa*, whence also the English word *purse*; hence also the officer, who in a college is called *burfar*, in a ship is called *purfer*.

BURSARS, or *Burfors*, (*Burfarii*), also denote those to whom stipends are paid out of a burse or fund appointed for that purpose.

BURSARIA, the burfary, or exchequer of collegiate and conventual bodies; or the place of receiving, paying, and accounting by the burfarii or burfers.

BURSE, in matters of commerce, denotes a public edifice in certain cities, for the meeting of merchants to negotiate bills, and confer on other matters relating to money and trade. In this sense, burse amounts to the same with what we otherwise call an *exchange* *.

The first place of this kind to which the name *Burse* was given, Guichardin assures us, was at Bruges; and it took its denomination from an hotel adjoining to it,

* See the article *Exchange*.

built by a lord of the family de la Bourfe, whose arms, which are three purfes, are ftill found on the crowning over the portal of the houfe. Catel's account is somewhat different, viz. that the merchants of Bruges bought a houfe or apartment to meet in, at which was the fign of the purfe. From this city the name was afterwards transferred to the like places in others, as in Antwerp, Amfterdam, Bergen in Norway, and London. This laft, anciently known by the name of the *common burfe of merchants*, had the denomination fince given it by queen Elizabeth, of the *royal exchange*. The moft confiderable burfe is that of Amfterdam, which is a large building, 230 feet long, and 130 broad, round which runs a periftyle 20 feet wide. The columns of the periftyle, which are 46, are numbered, for the conveniency of finding people. It will hold 4500 perfons.

In the times of the Romans there were public places for the meeting of merchants in moft of the trading cities of the empire: that built at Rome, in the 259th year after its foundation, under the confulate of Appius Claudius and Publius Servilius, was denominated the *collece of merchants*; fome remains of it are ftill to be feen, and are known by the modern Romans under the name *loggia*. The Hans towns, after the example of the Romans, gave the name of *colleges* to their burfes.

BURSTEN, denotes a perfon who has a rupture †.

BURTHEN of a SHIP. See BURDEN.

BURTON upon TRENT, a town of Staffordshire, in England. It had formerly a large abbey; and over the river Trent it has now a famous bridge of free ftone, about a quarter of a mile in length, fupported by 37 arches. It confifts chiefly of one long ftreet, which runs from the place where the abbey flood to the bridge; and has a good market for corn and provifions. Burton ale is reckoned the beft of any brought to London. E. Long. 1. 36. N. Lat. 52. 48.

BURTON, a town of Lincolnshire in England, feated on a hill near the river Trent. It is but a fmall place, and fituated in W. Long. 0. 30. N. Lat. 53. 40.

BURTON, a town of Westmoreland in England, feated in a valley near a large hill called *Farleton-knot-hill*. It is pretty well built, and lies on the great road from Lancafter to Carliffe. W. Long. 2. 35. N. Lat. 54. 10.

BURTON (Robert), known to the learned by the name of *Democritus junior*, was younger brother to William Burton who wrote "The antiquities of Leiceftershire;" and born of an ancient family at Lindley, in that county, upon the 8th of February 1576. He was educated in grammatical learning in the free fchool of Sutton Colfield in Warwickshire; in the year 1593 was fent to Brazen-nofe college in Oxford; and in 1599 was elefted ftudent of Chrift-church. In 1616, he had the vicarage of St Thomas, in the weft fuburb of Oxford, conferred upon him by the dean and canons of Chrift-church, to the parifhioners of which, it is faid, that he always gave the facrament in wafers; and this, with the rectory of Segrave in Leiceftershire, given him fome time after by George lord Berkeley, he held to the day of his death, which happened in January 1639.

He was a man of general learning; a great philofopher; an exact mathematician; and (what makes the peculiarity of his character) a very curious calculator

of nativities. He was extremely ftudious, and of a melancholy turn; yet an agreeable companion, and very humorous. *The anatomy of melancholy*, by *Democritus junior*, as he calls himfelf, fhews, that thefe different qualities were mixed together in his compofition. This book was printed firft in 4^o, afterwards in folio, in 1624, 1632, 1638, and 1652, to the great emolument of the bookfeller, who, as Mr Wood tells us, got an eltate by it. Some circumftances attending his death occafioned ftrange fufpicions. He died in his chamber at or very near the time which, it feems, he had fome years before predicted from the calculation of his nativity; and this exactnefs made it whifpered about, that, for the glory of aftrology, and rather than his calculation fhould fail, he became indeed a *felo de fe*. This, however, was generally difcredited; he was buried with due folemnity in the cathedral of Chrift-church, and had a fair monument erected to his memory. He left behind him a very choice collection of books. He bequeathed many to the Bodleian library; and 100 l. to Chrift-church, the intereft of which was to be laid out yearly in books for their library.

BURTON (John), D. D. a late worthy and learned divine, was born in 1696, at Wembworth, in Devonshire, his father being rector of that parifh; and was educated at Corpus Chrifti college, Oxford. In 1725, being then pro-prefor and mafter of the fchools, he fpoke a Latin oration before the determining bachelor, which is intitled "*Heli*; or, An inftance of a magiftrate's erring through unfeafonable lenity;" written and publifhed with a view to encourage the falutary exercife of academical difcipline; and afterwards treated the fame fubject ftill more fully in four Latin fermons before the univerfity, and publifhed them with appendices. He alfo introduced into the fchools, Locke, and other eminent modern philofophers, as fuitable companions to Aristotle; and printed a double feries of philofophical queftions, for the ufe of the younger ftudents; from which Mr Johnfon of Magdalen college, Cambridge, took the hint of his larger work of the fame kind, which has gone through feveral editions.

When the fettling of Georgia was in agitation, Dr Bray, juftly revered for his institution of parochial libraries, Dr Stephen Hales, Dr Berriman, and other learned divines, intreated Mr Burton's pious affiftance in that undertaking. This he readily gave, by preaching before the fociety in 1732, and publifhing his fermon, with an appendix on the ftate of that colony; and he afterwards publifhed an account of the defigns of the affociates of the late Dr Bray, with an account of their proceedings.

About the fame time, on the death of Dr Edward Littleton, he was prefented by Eton college to the vicarage of Maple-Derham, in Oxfordshire. Here a melancholy fcene, which too often appears in the manfions of the clergy, prefented itfelf to his view; a widow, with three infant daughters, without a home, without a fortune: from his compaffion arofe love, the confequence of which was marriage; for Mrs Littleton was handfome, elegant, accomplished, ingenious, and had great fweetnefs of temper. In 1760, he exchanged his vicarage of Maple-Derham for the rectory of Worplefton in Surry. In his advanced age, finding his eyes begin to fail him, he collected and publifhed, in one volume, all his fcattered pieces, under the title of *Opuscula*

† See Rupture.

Burton
Burying.

cula miscellanea; and soon after died, February 11th, 1771.

BURTON, in the sea-language, a small tackle consisting of two single blocks, and may be made fast anywhere at pleasure, for hoisting small things in and out.

BURY, is sometimes used to denote the hole or den of some animal under ground &c. In this sense we say the *bury* of a mole, a tortoise, or the like. The grillo-talpa, or mole-cricket, digs itself a bury with its forefeet, which are made broad and strong for that purpose. Naturalists speak of a kind of urchins in the island of Maraguan, which have two entries to their buries, one towards the north, the other to the south, which they open and shut alternately as the wind happens to lie.

BURY, in geography, a market-town of Lancashire, about 30 miles south-east of Lancaster. W. Long. 2. 20. N. Lat. 53. 36.

BURY (St Edmund's), or *St Edmund's Bury*, the county town of Suffolk, about 12 miles east of Newmarket, and 70 north-east of London. E. Long. o. 45. N. Lat. 52. 20.

BURYING, the same with interment or BURIAL.

BURYING *Alive* was the punishment of a vestal who had violated her vow of virginity. The unhappy priestess was let down into a deep pit, with bread, water, milk, oil, a lamp burning, and a bed to lie on. But this was only for show; for the moment she was let down, they began to cast in the earth upon her till the pit was filled up *. Some middle-age writers seem to make burying alive, (*desuffio*), the punishment of a woman thief. Lord Bacon gives instances of the resurrection of persons who have been buried alive. The famous Duns Scotus is of the number; who, having been seized with a catalepsy, was thought dead, and laid to sleep among his fathers, but raised again by his servant in whose absence he had been buried. Bartholin gives an account of a woman, who, on recovering from an apoplexy, could not be convinced but that she was dead, and solicited so long and so earnestly to be buried, that they were forced to comply; and performed the ceremonies, at least in appearance. The famous emperor Charles V. after his abdication, took it into his head to have his burial celebrated in his lifetime, and assisted at it.

BURYING-Place. The ancients buried out of cities and towns; an usage which we find equally among Jews, Greeks, and Romans. Among the last, burying within the walls was expressly prohibited by a law of the 12 tables. The usual places of interment were in the suburbs and fields, but especially by the waysides. We have instances, however, of persons buried in the city; but it was a favour allowed only to a few of singular merit in the commonwealth. Plutarch says, those who had triumphed were indulged in it. Be this as it will, Val. Publicola, and C. Fabricius, are said to have had tombs in the forum; and Cicero adds Tullius to the number. Lycurgus allowed his Lacedaemonians to bury their dead within the city and around their temples, that the youth, being inured to such spectacles, might be the less terrified with the apprehension of death. Two reasons are alleged why the ancients buried out of cities: the first, an opinion, that the sight, touch, or even neighbourhood, of a corpse defiled a man, especially a priest; whence that rule in

Busebe
Bath.

A. Gellius, that the *flamen Dialis* might not on any account enter a place where there was a grave: the second to prevent the air from being corrupted by the stench of putrefied bodies, and the buildings from being endangered by the frequency of funeral fires.

Burying in churches was not allowed for the first 300 years after Christ; and the same was severely prohibited by the Christian emperors for many ages afterwards. The first step towards it appears to have been the practice of erecting churches over the graves of some martyrs in the country, and translating the relics of others into churches in the city: the next was, allowing kings and emperors to be buried in the atrium or church-porch.

In the 6th century, the people began to be admitted into the church-yards; and some princes, founders, and bishops, into the church. From that time the matter seems to have been left to the discretion of the bishop.

BUSBEC (Auger Giflen, lord of), a person illustrious on account of his embassies, was born at Commines, in the year 1522; and educated at the most famous universities, at Louvain, at Paris, at Venice, at Bologna, and at Padua. He was engaged in several important employments and negotiations, and particularly was twice sent ambassador by the king of the Romans to the emperor Soliman. He collected inscriptions; bought manuscripts; searched after rare plants; inquired into the nature of animals; and, in his second journey to Constantinople, carried with him a painter, that he might be able to communicate to the curious, the figures, at least, of the plants and animals that were not well known in the west. He wrote a Discourse of the state of the Ottoman empire, and a Relation of his two journeys to Turkey, which are much esteemed. He died in 1592.

BUSBY (Dr Richard), son of a gentleman in Westminster, was born at Luton in Lincolnshire, in 1606. He passed through the classes in Westminster school, as king's scholar; and completed his studies at Christchurch, Oxford. In 1640, he was appointed master of Westminster school; and by his skill and diligence in the discharge of this important and laborious office, for the space of 55 years, bred up the greatest number of eminent men in church and state that ever at one time adorned any age or nation. He was extremely severe in his school; though he applauded wit in his scholars, even when it reflected on himself. This great man, after a long and healthy life purchased by temperance, died in 1695, aged 89; and was buried in Westminster abbey, where there is a fine monument erected for him, with a Latin inscription. He composed several books for the use of his school.

BUSH (Paul), the first bishop of Bristol, became a student in the university of Oxford about the year 1513, and in 1518 took the degree of bachelor of arts. He afterwards became a brother of the order called *bonhomus*; of which, after studying some time among the friars of St Austin, (now Wadham college), he was elected provincial. In that station he lived many years; till at length king Henry VIII. being informed of his great knowledge in divinity and physic, made him his chaplain, and in 1542 appointed him to the new episcopal see of Bristol: but having in the reign of Edward VI. taken a wife, he was, on the accession of Mary, deprived of his dignity, and spent the remainder

See the article Burying.

See the article Burying.

of his life in a private flatation at Bristol, where he died in the year 1558, aged 68, and was buried on the north side of the choir of the cathedral. Wood says, that while he was a student at Oxford, he was numbered among the celebrated poets of that university; and Pits gives him the character of a faithful catholic, his want of chastity notwithstanding. He wrote, 1. An exhortation to Margaret Burges, wife to John Burges, clothier, of King's-wood, in the county of Wilts. Lond. printed in the reign of Edward VI. 8^{vo}. 2. Notes on the Psalms. 3. Treatise in praise of the cross. 4. Answer to certain queries concerning the abuses of the mass. Records, n^o 25. 5. Dialogues between Christ and the Virgin Mary. 6. Treatise of salves and curing remedies. 7. A little treatise in English, called *The extirpation of ignorancy*, &c. in verse, Lond. by Pinfon, 4^{to}. 8. *Carmina diversa*.

BUSH, a term used for several shrubs of the same kind growing close together: thus we say, a *surze-bush*, *bramble-bush*, &c.

BUSH is sometimes used, in a more general sense, for any assemblage of thick branches interwoven and mixed together.

Burning-Bush, that bush wherein the Lord appeared to Moses at the foot of mount Horeb, as he was feeding his father-in-law's flocks.

As to the person that appeared in the bush, the text says, "That the angel of the Lord appeared unto him in a flame of fire, out of the middle of the bush:" but whether it was a created angel, speaking in the person of God, or God himself, or (as the most received opinion is) Christ the son of God, has been matter of some controversy among the learned. Those who suppose it no more than an angel seem to imply that it would be a diminution of the majesty of God, to appear upon every occasion, especially when he has such a number of celestial ministers, who may do the business as well. But considering that God is present every where, the notification of his presence by some outward sign in one determinate place, (which is all we mean by his appearance), is in our conception less laborious (if any thing laborious could be conceived of God) than a delegation of angels upon every turn from heaven, and seems in the main to illustrate rather than debase the glory of his nature and existence. But however this be, it is plain that the angel here spoken of was no created being, from the whole context, and especially from his saying, "I am the Lord God, the Jehovah," &c. since this is not the language of angels, who are always known to express themselves in such humble terms as these, "I am sent from God; I am thy fellow-servant," &c. It is a vain pretext to say, that an angel, as God's ambassador, may speak in God's name and person; for what ambassador of any prince ever yet said, "I am the king?" Since therefore no angel, without the guilt of blasphemy, could assume these titles; and since neither God the Father, nor the Holy Ghost, are ever called by the name of angel, i. e. "messenger, or person sent," whereas God the Son is called by the prophet Malachi, (chap. iii. 1.), "The angel of the covenant;" it hence seems to follow, that this angel of the Lord was God the Son, who might very properly be called an angel, because in the fulness of time he was sent into the world in our flesh, as a messenger from God, and might therefore make these his

temporary apparitions, prefaces, and forerunners, as it were, of his more solemn mission.

BUSHEL, a measure of capacity for dry things, as grain, fruits, dry pulse, &c. containing four pecks, or eight gallons, or one eighth of a quarter.

A bushel, by 12 Henry VII. c. 5. is to contain eight gallons of wheat; the gallon eight pounds of Troy-weight; the ounce 20 sterlings, and the sterling 32 grains or corns of wheat growing in the midst of the ear.

At Paris, the bushel is divided into two half-bushels; the half bushel into two quarts; the quart into two half quarts; the half quart into two litrons; and the litron into two half litrons. By a sentence of the provost of the merchants of Paris, the bushel is to be eight inches two lines and a half high, and ten inches in diameter; the quart four inches nine lines high, and six inches nine lines wide; the half quart four inches three lines high, and five inches diameter; the litron three inches and a half high, and three inches ten lines in diameter. Three bushels make a minot; six, a mine; 12, a septier; and 144, a muid. In other parts of France the bushel varies.

Oats are measured in a double proportion to other grains; so that 24 bushels of oats make a septier, and 288 a muid. The bushel of oats is divided into four picotins; the picotin into two half quarts, or four litrons. For salt, four bushels make one minot, and six a septier; for coals, eight bushels make one minot, 16 a mine, and 320 a muid; for lime, three bushels make a minot, and 48 minots a muid.

BUSKIN, a kind of shoe, somewhat in manner of a boot, and adapted to either foot, and worn by either sex. This part of dress, covering both the foot and mid-leg, was tied underneath the knee; it was very rich and fine, and principally used on the stage by actors in tragedy. It was of a quadrangular form; and the sole was so thick, as that, by means thereof, men of the ordinary stature might be raised to the pitch and elevation of the heroes they personated. The colour was generally purple on the stage; herein it was distinguished from the sock, worn in comedy, that being only a low common shoe. The buskin seems to have been worn, not only by actors, but by girls, to raise their height; travellers and hunters also made use of it, to defend themselves from the mire. In classic authors, we frequently find the buskin used to signify tragedy itself, in regard it was a mark of tragedy on the stage. It is also to be understood for a lofty strain, or high style.

BUSS, in maritime affairs, a small sea-vessel, used by us and the Dutch in the herring-fishery, commonly from 48 to 60 tons burden, and sometimes more: a buss has two small decks or cabins, one at the prow, and the other at the stern; that at the prow serves for a kitchen. Every buss has a master, an assistant, a mate, and seamen in proportion to the vessel's bigness; the master commands in chief, and without his express orders the nets cannot be cast nor taken up; the assistant has the command after him; and the mate next, whose business is to see the seamen manage their rigging in a proper manner, to mind those who draw in their nets, and those who kill, gut, and cure the herrings, as they are taken out of the sea: the seamen do generally engage for a whole voyage in the lump. The provision

Buffy
Butcher.

vision which they take on board the buffes, consist commonly in biscuit, oat-meal, and dried or salt fish; the crew being content for the rest with what fresh fish they catch. See FISHERIES.

BUSSY. See RABUTIN.

BUST, or BUSTO, in sculpture, &c. a term used for the figure or portrait of a person in relieve, shewing only the head, shoulders, and stomach, the arms being lopped off: it is usually placed on a pedestal or console.

BUSTARD, in ornithology. See OTIS.

BUSTUARI, in Roman antiquity, gladiators who fought about the bustum or funeral pile of a person of distinction, that the blood which was spilt might serve as a sacrifice to the infernal gods, and render them more propitious to the manes of the deceased. This custom was introduced in the room of the more inhuman one of sacrificing captives at the bustum, or on the tombs of warriors.

BUSTUARIÆ MOECHÆ, according to some, women that were hired to accompany the funeral and lament the loss of the deceased: but others are of opinion, that they were rather the more common prostitutes, that stood among the tombs, graves, and other such lonely places.

BUSTUM, in antiquity, a pyramid or pile of wood, upon which were anciently placed the bodies of the deceased, in order to be burnt. Some authors say, that it was properly called *bustum* after the burning, *quasi beneustum*: that before the burning it was called *pyra*; and during the burning, *roga*.

The bustum in the Campus Martius was encompassed round with white stone and an iron rail.

BUTCHER, a person who slaughters cattle for the use of the table, or who cuts up and retails the same.

Among the ancient Romans, there were three kinds of established butchers, whose office it was to furnish the city with the necessary cattle, and to take care of preparing and vending their flesh. The *suarii* provided hogs; the *pecuarii* or *boarii*, other cattle, especially oxen; and under these was a subordinate class, whose office was to kill, called *lanii*, and *carnifices*. To exercise the office of butcher among the Jews with dexterity, was of more reputation than to understant the liberal arts and sciences. They have a book concerning shame-constitution; and in case of any difficulty, they apply to some learned rabbi for advice: nor was any allowed to practise this art, without a licence in form; which gave the man, upon evidence of his abilities, a power to kill meat, and others to eat what he killed; provided he carefully read every week for one year, and every month the next year, and once a quarter during his life, the constitution above mentioned. We have some very good laws for the better regulation and preventing the abuses committed by butchers. A butcher that sells swine's flesh mangled, or dead of the murrain, for the first offence shall be amerced; for the second, have the pillory; for the third, be imprisoned, and make fine; and for the fourth, abjure the town. Butchers not selling meat at reasonable prices, shall forfeit double the value, leviable by warrant of two justices of the peace. No butcher shall kill any flesh in his scalding-house, or within the walls of London, on pain to forfeit for every ox so killed, 12 *d.* and for every other beast, 8 *d.* to be divided betwixt the king and the

prosecutor.

BUTCHER-BIRD, in ornithology. See LANIUS.

BUTCHER-BROOM, in botany. See RUSCUS.

BUTE, an island lying to the west of Scotland, being separated from Cowal, a district of Argylehire, only by a narrow channel. In length it is about 18 miles; the broadest part from east to west is about five. Part of it is rocky and barren; but from the middle fourthwards, the ground is cultivated, and produces pease, oats, and barley. Here is a quarry of red stone, which the natives have used in building a fort and chapel in the neighbourhood of Rothsay, which is a very ancient royal borough, head town of the shire of Bute and Arran; but very thinly peopled, and maintained chiefly by the herring fishery, with the profits of which all the rents of this island are chiefly paid. On the north side of Rothsay are the ruins of an ancient fort, with its draw-bridge, chapel, and barracks. Here are likewise the remains of some Danish towers. The natives are healthy and industrious, speak the Erse and the dialect of the Lowlands indifferently, and profess the Protestant religion. The island is divided into two parishes, accommodated with four churches; and belongs chiefly to the earl of Bute, who possesses an elegant seat near Rothsay. This island, with that of Arran, the greater and lesser Cumbray, and *Irish-marnoe*, form a county under the name of *Bute*. This shire and that of Caithness send a member to parliament alternately. The earl of Bute is admiral of the country, by commission from his majesty; but no way dependent on the lord high admiral of Scotland: so that if any maritime case occurs within this jurisdiction, (even crimes of as high a nature as murder or piracy), his lordship, by virtue of the powers as admiral, is sufficient judge, or he may delegate his authority to any deputies. The name of this isle has by several authors, and in different periods, been very differently written, as *Bote*, *Bath*, *Bothe*, *Boot*, but now generally *Bute*. Our ancient writers suppose that it derived its name from a cell erected therein by St Brendan, an Irish abbot who flourished in the 6th century, because in his language such a cell was called *Bath*. It is, however, probable, that this name was of greater antiquity, since we find it denominated *Botis* by the anonymous geographer of Ravenna. It was from very early times part of the patrimony of the Stewarts: large possessions in it were granted to Sir John Stewart, son of Robert II. by his beloved mistress Elizabeth More; and it has continued in that line to the present time.

BUTEO, in ornithology, the trivial name of a species of FALCO.

BUTLER (Charles), a native of Wycomb in the county of Bucks, and a master of arts in Magdalen college, Oxford, published a book with this title, "The principles of music in singing and setting; with the two-fold use thereof, ecclesiastical and civil." Quarto, London 1636. The author of this book was a person of singular learning and ingenuity, which he manifested in sundry other works enumerated by Wood in the *Athen. Oxon.* Among the rest is an English grammar, published in 1633, in which he proposes a scheme of regular orthography, and makes use of characters, some borrowed from the Saxon, and others of his own invention, so singular, that we want types to exhibit them: and of this imagined improvement he appears

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Butler.

Butler.

to have been so fond, that all his tracts are printed in like manner with his grammar; the consequence whereof has been an almost general disgust to all that he has written. His "Principles of music" is, however, a very learned, curious, and entertaining book; and, by the help of the advertisement from the printer to the reader, prefixed to it, explaining the powers of the several characters made use of by him, may be read to great advantage, and may be considered as a judicious supplement to Morley's introduction.

BUTLER (Samuel), a celebrated poet of the last century, was the son of a reputable Worcester-shire farmer, and born in 1612. He passed some time at Cambridge, but was never matriculated in that university. Returning to his native country, he lived some years as clerk to a justice of peace; where he found sufficient time to apply himself to history, poetry, and painting. Being recommended to Elizabeth countess of Kent, he enjoyed in her house, not only the use of all kinds of books, but the conversation of the great Mr Selden, who often employed Butler to write letters, and translate for him. He lived also some time with Sir Samuel Luke, a gentleman of an ancient family in Bedfordshire, and a famous commander under Oliver Cromwell; and he is supposed at this time to have wrote, or at least to have planned, his celebrated *Hudibras*; and under that character to have ridiculed the knight. The poem itself furnishes this key; where, in the first canto, *Hudibras* says,

" 'Tis sung, there is a valiant mimaloke

" In foreign Land yclep'd ———

" To whom we oft have been compar'd

" For person, parts, address, and beard."

After the restoration, Mr Butler was made secretary to the earl of Carbury, lord-president of Wales, who appointed him steward of Ludlow castle, when the court was revived there. No one was a more generous friend to him than the earl of Dorset and Middlesex, to whom it was owing that the court talked his *Hudibras*. He had promises of a good place from the earl of Clarendon, but they were never accomplished; though the king was so much pleased with the poem, as often to quote it pleasantly in conversation. It is indeed said, that Charles ordered him the sum of 3000*l*.: but the sum being expressed in figures, somebody through whose hands the order passed, by cutting off a cipher, reduced it to 300*l*. which, though it passed the offices without fees, proved not sufficient to pay what he then owed; so that Butler was not a shilling the better for the king's bounty. He died in 1680: and though he met with many disappointments, was never reduced to any thing like want, nor did he die in debt.—Mr Granger observes, that Butler "stands without rival in burlesque poetry. His *Hudibras* (says he) is, in its kind, almost as great an effort of genius, as the *Paradise Lost* itself. It abounds with uncommon learning, new rhimes, and original thoughts. Its images are truly and naturally ridiculous. There are many strokes of temporary satire, and some characters and allusions which cannot be discovered at this distance of time."

BUTLER (Joseph), late bishop of Durham, a prelate distinguished by his piety and learning, was the youngest son of Mr Thomas Butler, a reputable shopkeeper at Wantage, in Berkshire, where he was born in the year 1692. His father, who was a presbyterian, ob-

serving that he had a strong inclination to learning, after his being at a grammar-school, sent him to an academy in Gloucestershire, in order to qualify him for a dissenting minister; and while there, he wrote some remarks on Dr Clarke's first sermon at Boyle's lecture. Afterwards, resolving to conform to the established church, he studied at Oriel college, where he contracted an intimate friendship with Mr Edward Talbot, son of the bishop of Durham, and brother to the lord chancellor, who laid the foundation of his subsequent advancement. He was first appointed preacher at the Rolls, and rector of Haughton and Stanhope, two rich benefices in the bishopric of Durham. He quitted the Rolls in 1726; and published in 8vo a volume of sermons, preached at that chapel. After this he constantly resided at Stanhope, in the regular discharge of all the duties of his office, till the year 1733, when he was called to attend the lord chancellor Talbot as his chaplain, who gave him a prebend in the church of Rochester. In the year 1736, he was appointed clerk of the closet to queen Caroline, whom he attended every day, by her majesty's special command, from seven to nine in the evening. In 1738 he was appointed to the bishopric of Bristol; and not long afterwards to the deanry of St Paul's, London. He now resigned his living of Stanhope. In the year 1746, he was made clerk of the closet to the king; and in 1750, was translated to Durham. This rich preferment he enjoyed but a short time; for he died at Bath June 16th, 1752. His corpse was interred in the cathedral at Bristol; where there is a monument, with an inscription, erected to his memory. He died a bachelor. His deep learning and comprehensive mind appear sufficiently in his writings, particularly in that excellent treatise intitled, *The Analogy of religion, natural and revealed, to the constitution and course of nature*, published in 8vo, 1736.

BUTLER, the name anciently given to an officer in the court of France, being the same as the grand echancon, or great cup-bearer of the present times.

BUTLER, in the common acceptation of the word, is an officer in the houses of princes and great men, whose principal business is to look after the wine, plate, &c.

BUTLERAGE of wine, is a duty of 2*s*. for every ton of wine imported by merchants strangers; being a composition in lieu of the liberties and freedoms granted to them by king John and Edward I. by a charter called *charta mercatoria*.

Butlerage was originally the only custom that was payable upon the importation of wines, and was taken and received by virtue of the regal prerogative, for the proper use of the crown. But for many years past, there having been granted by parliament subsidies to the kings of England, and the duty of butlerage not repealed, but confirmed, they have been pleased to grant the same away to some nobleman, who, by virtue of such grant, is to enjoy the full benefit and advantage thereof, and may cause the same to be collected in the same manner that the kings themselves were formerly wont to do.

BUTMENT. Butments of arches are the same with buttresses. They answer to what the Romans call *sublicar*, the French *culees* and *butees*.

BUTMENTS, or *Abutments*, of a bridge, denote the

Butler
Butment.

Butomus
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Butter.

two maffives at the end of a bridge, whereby the two extreme arches are fupported and joined with the fhore on either fide.

BUTOMUS, the *FLOWERING-RUSH*, or *Water-gladiole*; a genus of the hexagynia order, belonging to the encandria clafs of plants. Of this there is but one fpecies, *viz.* the umbellatus. Of this there are two varieties, the one with a white, the other with a rofe-coloured, flower. Tho' common plants, thefe are very pretty, and are worth propagating in a garden where there is convenience for an artificial bog, or where there are ponds of ftanding water, as is many times the cafe. Where thefe conveniences are wanting, they may be planted in cifterns, which fhould be kept filled with water, with about a foot thicknefs of earth in the bottom; and into this earth the roots fhould be planted, or the feeds fown as foon as they are ripe.

BUTRINTO, a port-town of Epirus, or Canina, in Turkey in Europe, fituated oppofite to the ifland of Corfu, at the entrance of the gulph of Venice. E. Long. 20. 40. N. Lat. 39. 45.

BUTT, in commerce, a veffel or meafure of wine, containing two hogheads, or 126 gallons. See *Pipe*.

BUTT, or *Butt-ends*, in the fea-language, are the fore-ends of all planks under water, as they rife, and are joined one end to another.—*Butt-ends* in great fhips are moft carefully bolted; for if any one of them fhould fpring or give way, the leak would be very dangerous and difficult to flop.

BUTTS, the place where archers meet with their bows and arrows to fhoot at a mark, which we call fhooting at the *butts*.—Alfo *butts* are the fhort pieces of land in arable ridges and furrows.

BUTTER, a fat unctuous fubftance, prepared from milk by heating or churning.

It was late ere the Greeks appear to have had any notion of butter; their poets make no mention of it, and yet are frequently fpeaking of milk and cheefe.

The Romans ufed butter no otherwife than as a medicine, never as a food.

The ancient Chriftians of Egypt burnt butter in their lamps inftead of oil; and in the Roman churches, it was anciently allowed, during Chriftmas time, to burn butter inftead of oil, on account of the great confumption of it otherwife.

For the making of butter, when it has been churned, open the churn, and with both hands gather it well together, take it out of the butter-milk, and lay it into a very clean bowl, or earthen pan; and if the butter be defigned to be ufed fweet, fill the pan with clear water, and work the butter in it to and fro, till it is brought to a firm confiftence of itfelf, without any moiature. When this has been done, it muft be fcooped and fliced over with the point of a knife, every way as thick as poffible, in order to fetch out the fmalleft hair, mote, bit of rag, ftrainer, or any thing that may have happened to fall into it. Then fpread it thin in a bowl, and work it well together, with fuch a quantity of falt as you think fit, and make it up into difhes, pounds, half pounds, &c.

There are as many forts of butter, as there are different milks of animals whereof to make it: That of the cow is moft in ufe. The northern people, however, make more ufe of it than others. In the *Georgical Effays*, Vol. V. p. 209. we have the following me-

Butter.

thod of making well-tafted butter from the milk of cows fed on turnips. "Let the bowls, either lead or wood, be kept constantly clean, and well fcaled with boiling water before ufed. When the milk is brought into the dairy, to every eight quarts mix one quart of boiling water; then put up the milk into the bowls to ftand for cream."

Butter is the fat, oily, and inflammable part of the milk. This kind of oil is naturally diftributed through all the fubftances of the milk in very fmall particles, which are interpoled betwixt the cafeous and ferous parts, amongst which it is fufpended by a flight adhefion but without being diffolved. It is in the fame ftate in which oil is, in emulfiors: hence the fame whitenefs of milk and emulfiors; and hence, by reft, the oily parts feparate from both thefe liquors to the furface, and form a cream. See *EMULSION*.

When butter is in the ftate of cream, its proper oily parts are not yet fufficiently united together to form an homogeneous mafs. They are ftill half feparated by the interpoftion of a pretty large quantity of ferous and cafeous particles. The butter is completely formed by preffing out thefe heterogeneous parts by means of continued percuftion. It then becomes an uniform foft mafs.

Frefh butter which has undergone no change, has fcarcely any fmell; its tafte is mild and agreeable, it melts with a weak heat, and none of its principles are difengaged by the heat of boiling water. Thefe properties prove that the oily part of butter is of the nature of the fat, fixed, and mild oils obtained from many vegetable fubftances by expreffion. See *OIL*.—The half fluid confiftence of butter, as of moft other concrete oily matters, is thought to be owing to a confiderable quantity of acid united with the oily part; but this acid is fo well combined, that it is not fenfible while the butter is frefh, and has undergone no change; but when it grows old, and undergoes fome kind of fermentation, then the acid is difengaged more and more; and this is the caufe that butter, like oils of the fame kind, becomes rancid by age.

Butter is constantly ufed in food, from its agreeable tafte; but to be wholefome, it muft be very frefh and free from rancidity, and alfo not fried or burnt; otherwife its acid and even cauftic acid, being difengaged, diforders digeftion, renders it difficult and painful, excites acid empyreumatic belchings, and introduces much acrimony into the blood. Some perfons have ftomachs fo delicate, that they are even affected with thefe inconveniences by frefh butter and milk. This obfervation is alfo applicable to oil, fat, chocolate, and in general to all oleaginous matters.

The trade in butter is very confiderable. Some compute 50,000 tons annually confumed in London. It is chiefly made within 40 miles round the city. Fifty thoufand firkins are laid to be fent yearly from Cambridge and Suffolk alone; each firkin containing 56 pounds. Uttoxeter in Staffordfhire is a market famous for good butter, infomuch that the London merchants have an eftablifhed factory there for butter. It is bought by the pot, of a long cylindrical form, weighing 14 lb. Divers abufes are committed in the packing and falt- ing of butter, to increafe its bulk and weight, againft which we have a ftatute exprefs. Pots are frequently laid with good butter for a little depth at the top, and

with

Butter
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Button.

with bad at the bottom; sometimes the butter is set in rolls, only touching at top, and standing hollow at bottom. To prevent these cheats, the factors at Utoxeter keep a surveyor, who, in case of suspicion, tries the pots with an iron instrument called a *butter-bore*, made like a cheese-taste, to be struck in obliquely to the bottom.

Shower of BUTTER. Naturalists speak of showers and dews of a butyraceous substance. In 1695, there fell in Ireland, during the winter and ensuing spring, a thick yellow dew, which had the medicinal properties of butter.

BUTTER, among chemists, a name given to several preparations, on account of their consistence resembling that of butter; as butter of antimony*, &c.

BUTTER-Bur, in botany. See TUSSILAGO.

BUTTER-Milk, a kind of serum that remains behind, after the butter is made.

BUTTER-Wort, in botany. See Pinguicula.

BUTTERFLY, the English name of a numerous genus of insects. See PAPILIO.

BUTTERFLY-Shell, in natural history. See VOLUTA.

Method of Preserving BUTTERFLIES. See INSECTS.

Method of making Pictures of BUTTERFLIES. "Take butterflies, or field-moths, either those caught abroad, or such as are taken in caterpillars, and nursed in the house till they be flies; clip off their wings very close to their bodies, and lay them on clean paper, in the form of a butterfly when flying; then have ready prepared gum arabic that hath been some time dissolved in water, and is pretty thick; if you put a drop of ox-gall into a spoonful of this, it will be better for the use; temper them well with your finger, and spread a little of it on a piece of thin white paper, big enough to take both sides of your fly; when it begins to be clammy under your finger, the paper is in proper order to take the feathers from the wings of the fly; then lay the gummed side on the wings, and it will take them up; then double your paper so as to have all the wings between the paper; then lay it on a table, pressing it close with your fingers; and you may rub it gently with some smooth hard thing; then open the paper and take out the wings, which will come forth transparent: the down of the upper and under side of the wings, sticking to the gummed paper, form a just likeness of both sides of the wings in their natural shapes and colours. The nicety of taking off flies depends on a just degree of moisture of the gum'd paper: for if it be too wet, all will be blotted and confused; and if too dry, your paper will stick so fast together, that it will be torn in separation. When you have opened your gum'd papers, and they are dry, you must draw the bodies from the natural ones, and paint them in water-colours: you must take paper that will bear ink very well for this use; for sinking paper will separate with the rest, and spoil all."

BUTTERIS, in the menage, an instrument of steel, fitted to a wooden handle, wherewith they pare the foot, or cut off the hoof of a horse.

BUTTOCK of a SHIP, is that part of her which is her breadth right astern, from the tack upwards; and a ship is said to have a broad or a narrow buttock, according as she is built broad or narrow at the transom.

BUTTON, an article in dress, whose form and use are too well known to need description. They are

made of various materials, as mohair, silk, horse-hair, metal, &c.

Method of making common BUTTONS. Common buttons are generally made of mohair; some indeed are made of silk, and others of thread; but the latter are of a very inferior sort. In order to make a button, the mohair must be previously wound on a bobbin; and the mould fixed to a board by means of a bodkin thrust through the hole in the middle of it. This being done, the workman wraps the mohair round the mould in three, four, or six columns, according to the button.

Horse-hair BUTTONS. The moulds of these buttons are covered with a kind of stuff composed of silk and hair; the warp being belladine silk, and the shoot horse-hair. This stuff is wove with two selvages, in the same manner and in the same loom as ribbands. It is then cut into square pieces proportional to the size of the button, wrapped round the moulds, and their selvages stitched together, which form the under part of the button.

Cleansing of BUTTONS. A button is not finished when it comes from the maker's hands; the superfluous hairs and hubs of silk must be taken off, and the button rendered glossy and beautiful, before it can be sold. This is done in the following manner. A quantity of buttons are put into a kind of iron sieve, called by workmen a *singeing box*. Then a little spirit of wine being poured into a kind of shallow iron dish, and set on fire, the workman moves and shakes the singeing box, containing the buttons, briskly over the flame of the spirit, by which the superfluous hairs, hubs of silk, &c. are burnt off, without damaging the buttons. Great care, however, must be taken that the buttons in the singeing box be kept continually in motion; for if they are suffered to rest over the flame, they will immediately burn. When all these loose hairs, &c. are burnt off by the flame of the spirit, the buttons are taken out of the singeing box, and put, with a proper quantity of the crumbs of bread, into a leather bag, about three feet long, and of a conical shape; the mouth or smaller end of which being tied up, the workman takes one of the ends in one hand, and the other in the other, and shakes the hand briskly with a particular jerk. This operation cleanses the buttons, renders them very glossy, and fit for sale.

Gold-twist BUTTONS. The mould of these buttons is first covered in the same manner with that of common buttons. This being done, the whole is covered with a thin plate of gold or silver, and then wrought over of different forms, with purple and gimp. The former is a kind of thread composed of silk and gold-wire twisted together; and the latter, capillary tubes of gold or silver, about the tenth of an inch long. These are joined together by means of a fine needle, filled with silk, thrust through their apertures, in the same manner as beads or bugles.

The manner of making Metal-BUTTONS. The metal with which the moulds are intended to be covered is first cast into small ingots, and then flatted into thin plates or leaves, of the thickness intended, at the stamping-mills; after which it is cut into small round pieces proportionable to the size of the mould they are intended to cover, by means of proper punches on a block of wood covered with a thick plate of lead. Each piece

of

Button.

* See Chemi-
stry, 10258.

Edwards's
History of
Birds,
Vol. II.
p. 122.

Button,
Buttress.

of metal thus cut out of the plate is reduced into the form of a button, by beating it successively in several cavities, or concave moulds, of a spherical form, with a convex puncheon of iron, always beginning with the shallowest cavity or mould, and proceeding to the deeper, till the plate has acquired the intended form: and the better to manage so thin a plate, they form ten, twelve, and sometimes even twenty-four, to the cavities, or concave moulds, at once; often heating the metal during the operation, to make it more ductile. This plate is generally called by workmen, the *cap of the button*.

The form being thus given to the plates, or caps, they strike the intended impression on the convex side, by means of a similar iron puncheon, in a kind of mould engraved *en creux*, either by the hammer, or the press used in coining. The cavity or mould, wherein the impression is to be made, is of a diameter and depth suitable to the sort of button intended to be struck in it; each kind requiring a particular mould. Between the puncheon and the plate is placed a thin piece of lead, called by workmen a *bob*, which greatly contributes to the taking off all the strokes of the engraving; the lead, by reason of its softness, easily giving way to the parts that have relieve, and as easily insinuating itself into the traces or indentures.

The plate thus prepared makes the cap or shell of the button. The lower part is formed of another plate, in the same manner, but much flatter, and without any impression. To the last or under plate is soldered a small eye made of wire, by which the button is to be fastened.

The two plates being thus finished, they are soldered together with soft solder, and then turned in a lathe. Generally indeed they use a wooden mould, instead of the under plate; and in order to fasten it, they pass a thread or gut across, through the middle of the mould, and fill the cavity between the mould and the cap with cement, in order to render the button firm and solid; for the cement entering all the cavities formed by the relieve of the other side, sustains it, prevents its flattening, and preserves its hoise or design.

BUTTON, in the menage. Button of the reins of a bridle, is a ring of leather, with the reins passed thro' it, which runs all along the length of the reins. To put a horse under the button, is when a horse is stopped without a rider upon his back, the reins being laid on his neck, and the button lowered so far down that the reins bring in the horse's head, and fix it to the true posture or carriage. It is not only the horses which are managed in the hand that must be put under the button; for the same method must be taken with such horses as are bred between two pillars, before they are backed.

BUTTON-WOOD. See *CONOCARPUS*.

BUTTON'S BAY, the name of the north part of Hudson's bay, in North America, whereby Sir Thomas Button attempted to find out a north-west passage to the East Indies. It lies between 80° and 100° west longitude, and between 60° and 66° north latitude.

BUTTFRESS, a kind of buttment built archwise, or a mass of stone or brick, serving to prop or support the sides of a building, wall, &c. on the outside, where it is either very high, or has any considerable load to sustain on the other side, as a bank of earth, &c.—Buttresses

are used against the angles of steeples and other buildings of stone, &c. on the outside, and along the walls of such buildings as have great and heavy roofs, which would be subject to thrust the walls out, unless very thick, if no buttresses were placed against them. They are also placed for a support and buttment against the feet of some arches, that are turned across great halls in old palaces, abbies, &c.

BUTZAW, a town of lower Saxony, in Germany; it stands upon the river Varnow, on the road from Schwerin to Rostock, lying in E. Long. 13. 12. N. Lat. 54. 50.

BUXTON, a place in the peak of Derbyshire, celebrated for medicinal waters, the hottest in England, next to Bath, lying in W. Long. o. 20. N. Lat. 53. 20.

It has been always believed by our antiquaries, that the Romans were acquainted with these wells, and had frequented them much, as there is a military way still visible, called the *Bath-gate*, from Burgh to this place. This was verified about 50 years ago, when Sir Thomas Delves, of Cheshire, in memory of a cure he received here, caused an arch to be erected; in digging the foundations for which, they came to the remains of a solid and magnificent structure of Roman workmanship; and in other places of the neighbourhood, very capacious leaden vessels, and other utensils, of Roman workmanship, have been discovered. These waters have always been reckoned inferior to those in Somersetshire; but seem never to have been totally disused. They are mentioned by Leland, as well known 200 years ago; but it is certain they were brought into greater credit by Dr Jones in 1572, and by George earl of Shrewsbury, who erected a building over the bath, then composed of nine springs. This building was afterwards pulled down, and a more commodious one erected at the expence of the earl of Devonshire. In doing this, however, the ancient register of cures drawn up by the bath-warden, or physician attending the baths, and subscribed by the hands of the parties, was lost.

The warm waters of Buxton are, the bath, consisting of nine springs, as already mentioned, St Ann's well, and St Peter's or Bingham well. St Ann's well rises at the distance of somewhat more than 32 yards north-east from the bath. It is chiefly supplied from a spring on the north side, out of a rock of black limestone or bastard marble. It formerly rose into a stone basin, shut up within an ancient Roman brick wall, a yard square within, a yard high on three sides, and open on the fourth. But, in 1709, Sir Thomas Delves, as already mentioned, erected an arch over it which still continues. It is 12 feet long, and as many broad, set round with stone steps on the inside. In the middle of this dome the water now springs up into a stone basin two feet square. St Peter's or Bingham well rises about 20 yards south-east of St Ann's. It is also called *Leigh's well*, from a memorable cure received from it by a gentleman of that name. It rises out of a black limestone, in a very dry ground; and is not so warm as St Anne's well.

This water is alterant and not evacuant. The use of it is to be begun by taking a pint in the forenoon; after which, the quantity is to be gradually enlarged. This water increases the vital heat; and is useful in the gout, rheumatism, dry asthma, convulsive disorders, indigestion, loss of appetite, contractions of the tendons,

Butzaw,
Buxton.

Buxton.

† *Exp. Efr.*
Joyl, Vol. 11.
 p. 53.

Buxton.

&c. Mr Percival informs us†, that the water of St Anne's well contains calcareous earth, fossil alkali, and sea-salt, though in a very small proportion, a gallon of the water yielding only 23 or 24 grains of sediment. It strikes a slight green with syrup of violets, suffers no change from infusion of galls, from the fixed vegetable alkali, or from the mineral acids; it becomes milky with the volatile alkali, and with saccharum saturni; and lets fall a precipitate on the addition of a few drops of a solution of silver in the nitrous acid. The specific gravity of this water is precisely equal to that of rain-water when their temperatures are the same; but it weighs four grains in a pint lighter when first taken from the spring, owing to the superior degree of warmth it has at that time. The temperature of the bath is about 82° of Fahrenheit; that of St Ann's well, as it is a smaller body of water, and exposed to the open air, is somewhat less. The water is transparent, sparkling, and highly grateful to the palate. From some experiments which he made upon himself, the Doctor concludes, that the Buxton waters are of a very heating quality, and suggests the following cautions with regard to the use of them. Small quantities only should be drunk at once, and frequently repeated; the belly should be kept soluble with lenitive electuary, or any other mild purgative; and, at the beginning of the course, the patient may be directed to suffer the water to remain a few seconds in the glass before he swallows it; for this spring abounds with mephitic air, in which its stimulus, and indeed its efficacy, resides, and which is quickly dissipated by exposure to the air. From this property the Doctor supposed that this water might be easily converted into an useful chalybeate*; and, at his desire, Mr Buxton an apothecary near the wells made the following experiment. "A quart bottle containing two drachms of iron filings was filled, by immersion, with the water of St Ann's well, corked and agitated briskly under the surface of the water. It was then suffered to remain in the well till the filings had subsided, when the water was carefully decanted into a half-pint glass. To this were added three drops of the tincture of galls, which immediately occasioned a deep purple colour; and the transparency was quickly restored by a few drops of the acid of vitriol, evident proofs that a solution of the iron was effected in a few minutes. The water also, without the galls, had a chalybeate taste, and left an agreeable astringency upon the palate."

This method of impregnating the Buxton water with iron, must increase its tonic powers, and in many cases improve its virtues. It is a common practice to join the use of a chalybeate spring in the neighbourhood of St Ann's well, with that of the Buxton water. But the superiority of this artificial mineral water must be apparent, if we consider its agreeable warmth, volatility, levity, and gratefulness to the palate. Buxton-bath is frequently employed as a temperate cold bath. For, as the heat of the water is 16 or 18 degrees below that of the human body, a gentle shock is produced on the first immersion, the heart and arteries are made to contract more powerfully, and the whole system is braced and invigorated. But this salutary operation must be greatly diminished, often, indeed, more than counterbalanced, by the relaxing vapours which copiously exhale from the bath to which the patients are exposed during the time of dressing and undressing. June 12th 1772,

the mercury in Fahrenheit's thermometer stood, in the shade, at 65°; but in the vault of the bath, quickly rose to 78°.

BUXTON (Jedediah), a prodigy with respect to skill in numbers. His father, William Buxton, was school-master of the same parish, where he was born in 1704: yet Jedediah's education was so much neglected, that he was never taught to write; and with respect to any other knowledge but that of numbers, seemed always as ignorant as a boy of ten years of age. How he came first to know the relative proportions of numbers, and their progressive denominations, he did not remember; but to this he applied the whole force of his mind, and upon this his attention was constantly fixed, so that he frequently took no cognizance of external objects, and when he did it, it was only with respect to their numbers. If any space of time was mentioned, he would soon after say it was so many minutes; and if any distance of way, he would assign the number of hair-breadths, without any question being asked, or any calculation expected by the company. When lie once understood a question, he began to work with amazing facility, after his own method, without the use of a pen, pencil, or chalk, or even understanding the common rules of arithmetic as taught in the schools. A gentleman asked him the following question: Suppose a field 423 yards long and 383 wide, what was the area? and in two minutes, by the gentleman's watch, he answered, 162,009 yards. He then asked him how many acres the above field measured? and in 11 minutes he answered, 33 acres, 1 rood, 35 perches, 20 yards and a quarter jult. The gentleman then observed, that allowing the distance between London and York to be 204 miles, he would know how many times a coach-wheel turned round in that distance, allowing the wheel's circumference to be six yards? In thirteen minutes, he answered 59,840 times. The next proposition was, In a bin 346 inches long, 255 inches wide, and 94 inches deep, how many gallons liquid measure, and what corn would it hold? The answer was, 3,454,464 solid inches, or 1,768,568 half quarters of solid inches, making 12,249,872 gallons liquid measure, or 12,249 gallons, 3 quarts, and 34 and a half inches; or it will hold 191 quarters, 3 bushels, 3 quarters and a half quarter, and 34 inches and a half remainder. Again, suppose a canal was to be dug 426 feet long, 263 wide, and 2 feet and a half deep, how many cubical yards of earth are to be removed? After pausing a quarter of an hour, he answered, 10,373 yards 24 feet. He would stride over a piece of land or a field, and tell you the contents of it almost as exact as if you had measured it by the chain. In this manner he measured the whole lordship of Elmtou, of some thousand acres, belonging to Sir John Rhodes, and brought him the contents, not only in acres, roods, and perches, but even in square inches. After this, for his own amusement, he reduced them into square hair-breadths, computing 48 to each side of the inch. His memory was so great, that while resolving a question, he could leave off, and resume the operation again where he left off the next morning, or at a week, a month, or at several months, and proceed regularly till it was completed. His memory would doubtless have been equally retentive with respect to other objects, if he had attended to other objects with equal diligence; but his perpetual application to figures pre-

* See *Art.*
 1st 52.

Buxton,
Buxtorf.

prevented the smallest acquisition of any other knowledge. He was sometimes asked, on his return from church, whether he remembered the text, or any part of the sermon, but it never appeared that he brought away one sentence; his mind, upon a closer examination, being found to have been busied, even during divine service, in its favourite operation, either dividing some time, or some space, into the smallest known parts, or resolving some question that had been given him as a test of his abilities.

This extraordinary person living in laborious poverty, his life was uniform and obscure. Time, with respect to him, changed nothing but his age; nor did the seasons vary his employment, except that in winter he used a flail, and in summer a ling-hook. In the year 1754, he came to London, where he was introduced to the royal society, who, in order to prove his abilities, asked him several questions in arithmetic, and he gave them such satisfaction, that they dismissed him with a handsome gratuity. In this visit to the metropolis the only object of his curiosity, except figures, was his desire to see the king and royal family; but they being just removed to Kensington, Jedediah was disappointed. During his residence in London, he was taken to see King Richard III. performed at Drury-lane playhouse; and it was expected, either that the novelty and the splendor of the shew would have fixed him in astonishment, or kept his imagination in a continual hurry, or that his passions would, in some degree, have been touched by the power of action, if he had not perfectly understood the dialogue. But Jedediah's mind was employed in the playhouse, just as it was employed in every other place. During the dance, he fixed his attention upon the number of steps; he declared, after a fine piece of music, that the innumerable sounds produced by the instruments had perplexed him beyond measure; and he attended even to Mr Garrick, only to count the words that he uttered, in which he said he perfectly succeeded. Jedediah returned to the place of his birth, where, if his enjoyments were few, his wishes did not seem to be more. He applied to his labour, by which he subsisted with cheerfulness; he regretted nothing that he left behind him in London; and it continued to be his opinion, that a slice of rusty bacon afforded the most delicious repast.

BUXTORF (John), a learned professor of Hebrew at Basil, who, in the 17th century, acquired the highest reputation for his knowledge of the Hebrew and Chaldean languages. He died of the plague at Basil, in 1629, aged 65. His principal works are, 1. A small but excellent Hebrew grammar; the best edition of which is that of Leyden in 1701, revised by Leusden. 2. A treatise of the Hebrew grammar. 3. An Hebrew concordance, and several Hebrew lexicons. 4. *Institutio epistolæ Hebraicæ*. 5. *De abbreviaturis Hebræorum, &c.*

BUXTORF (John), the son of the former, and a learned professor of the oriental languages at Basil, distinguished himself, like his father, by his knowledge of the Hebrew language, and his rabbinical learning. He died at Basil in 1664, aged 65 years. His principal works are, 1. His translation of the *Morè Nevochim*, and the *Cozzi*. 2. A Chaldean and Syriac lexicon. 3. An anticritic against Cappel. 4. A treatise on the Hebrew points and accents, against the same Cappel.

Buxton,
Buyer.

BUXUS, the BOX-TREE; a genus of the tetrandria order, belonging to the monœcia class of plants.

Species. 1. The arborefcens, with oval leaves. 2. The angustifolia, or narrow-leaved box. These two sorts grow in great plenty upon Boxhill near Dorking in Surry in England. Here were formerly large trees of that kind; but now they are much fewer in number. There are two or three varieties of the first sort which are propagated in gardens; one with yellow, and the other with white striped leaves. Another hath the tips of the leaves only marked with yellow, and is called *tipped box*. 3. The fruticulosa, dwarf or Dutch box, commonly used for bordering of flower-beds.

Culture. The two first sorts may be raised from seeds; and may be also propagated by cuttings, which are to be planted in the autumn in a shady border. The best season for removing these trees is in October; though, if care be used to take them up with a good ball of earth, they may be transplanted almost at any time except the middle of summer. The dwarf box is increased by parting the roots, or planting the slips; but as it makes so great an increase of itself, and so easily parts, it is hardly worth while to plant the slips that have no roots.

Uses. The tree or large box is proper to intermix in clumps of evergreens, &c. where it adds to the variety of such plantations: they are a very great ornament to cold and barren soils where few other things will grow. The dwarf kind of box is used for bordering flower-beds, or other purposes of that nature; and for this it far excels any other plant, being subject to no injuries from cold or heat. It is of long duration; is easily kept handsome; and, by the firmness of its rooting, keeps the mould in the borders from washing into the gravel walks more effectually than any plant whatever.—Boxwood is extremely hard and smooth, and therefore well adapted to the use of the turner. Combs, mathematical instruments, knife-handles, and button-moulds, are made of it. It may properly enough be substituted in default of ebony, the yellow alburnum of which it perfectly resembles. In the Ephemerides of the curious there is the following account of the efficacy of boxwood in making hair grow. "A young woman of Gunberg in Lower Silesia, having had a malignant dysentery which occasioned the falling off of all her hair, was advised by a person, some time after her recovery, (as her hair was not likely to grow again of itself, her head being then as bare as the hand), to wash it all over with a decoction of boxwood; which she readily did, without the addition of any other drug. Hair of a chestnut colour grew on her head, as she was told it would do; but having used no precaution to secure her neck and face from the lotion, they became covered with red hair to such a degree, that she seemed little different from an ape or a monkey." This decoction has been recommended by some as a powerful sudorific, preferable even to guaiacum; but the taste readily discovers that it wants the qualities of that wood. Neither the wood nor the leaves of the box-tree at present are used for any other medicinal purpose than the distillation of an empyreumatic oil; and an oil of nearly the same quality is obtained from almost every other wood.

BUYS, a town of Dauphiny in France, situated on the borders of Provence. E. Long. 5. 20. N. Lat.

Buzancois
Byng.

44. 25.

BUZANCOIS, a small town of Berry in France, situated on the borders of Tourain, in E. Long. 1. 29. N. Lat. 46. 38.

BUZBACH, a town of Germany, in Westervaria and the county of Holmes, on the confines of Hanau. E. Long. 10. 51. N. Lat. 50. 22.

BUZET, a small town of France, in Languedoc, seated on the river Torne, in E. Long. 1. 45. N. Lat.

43. 47.

BUZZARD, in ornithology, the name of several species of the hawk kind. See **FALCO**.

BYCHOW, a small town of Lithuania in Poland, situated on the river Nieper, in E. Long. 30. 2. N. Lat. 53. 57.

BY-LAWS, are laws made *obiter*, or by the by; such as orders and constitutions of corporations for the governing of their members, of court-leets, and courts baron; or commoners, or inhabitants in villis, &c. made by common assent, for the good of those that made them, in particular cases whereunto the public law doth not extend; so that they bind farther than the common or statute law: guilds and fraternities of trades by letters patent of incorporation, may likewise make by-laws for the better regulation of trade among themselves or with others. In Scotland these laws are called laws of *birlaw*, or *burlaw*; which are made by neighbours elected by common consent in the *birlaw-courts*, wherein knowledge is taken of complaints betwixt neighbour and neighbour; which men so chosen are judges and arbitrators, and styled *birlaw-men*. And birlaws, according to Skene, are *leges rusticorum*, laws made by husbandmen, or townships, concerning neighbourhood among them.—All by-laws are to be reasonable, and for the common benefit, not private advantage of particular persons, and must be agreeable to the public laws in being.

BYNG (George), lord viscount Torrington, was the son of John Byng, Esq; and was born in 1663. At the age of 15, he went volunteer to sea with the king's warrant. His early engagement in this course of life gave him little opportunity of acquiring learning or cultivating the polite arts; but by his abilities and activity as a naval commander he furnished abundant matter for the pens of others. After being several times advanced, he was in 1702 raised to the command of the *Nassau*, a third rate, and was at the taking and burning the French fleet at Vigo; and the next year he was made rear-admiral of the red. In 1704, he served in the grand fleet sent into the Mediterranean under Sir Cloudesly Shovel, as rear-admiral of the red; and it was he who commanded the squadron that attacked, cannonaded, and reduced Gibraltar. He was in the battle of Malaga, which followed soon after; and for his behaviour in that action queen Anne conferred on him the honour of knighthood. In 1705, in about two months time, he took 12 of the enemies largest privateers, with the *Thetis*, a French man of war of 44 guns; and also several merchant-ships, most of them richly laden. The number of men taken on board was 2070, and of guns 334. In 1718, he was made admiral and commander in chief of the fleet; and was sent with a squadron into the Mediterranean for the protection of Italy, according to the obligation England was under by treaty against the invasion of the Spaniards; who had the year

before surprised Sardinia, and had this year landed an army in Sicily. In this expedition he dispatched captain Walton in the *Canterbury*, with five more ships, in pursuit of six Spanish men of war, with galleys, fire-ships, bomb-vessels, and store-ships, who separated from the main fleet, and stood in for the Sicilian shore. The captain's laconic epistle on this occasion is worthy of notice; which shewed that fighting was his talent as well as his admiral's, and not writing.

"Sir,

"We have taken and destroyed all the Spanish ships "and vessels which were upon the coast, as per margin. *Canterbury*, off Syracuse, "I am, &c.

August 16th, 1718.

G. Walton."

From the account referred to, it appeared that he had taken four Spanish men of war, with a bomb-vessel and a ship laden with arms; and burned four, with a fire-ship and bomb-vessel. The king made the admiral an handsome present, and sent him plenipotentiary powers to negotiate with the princes and states of Italy as there should be occasion. He procured the emperor's troops free access into the fortresses that still held out in Sicily, failed afterwards to Malta, and brought out the Sicilian galleys, and a ship belonging to the Turkey company. Soon after he received a gracious letter from the emperor Charles VI. written with his own hand, accompanied with a picture of his imperial majesty, set round with very large diamonds, as a mark of the grateful sense he had of his services. It was entirely owing to his advice and assistance, that the Germans retook the city of Messina in 1719, and destroyed the ships that lay in the basin; which completed the ruin of the naval power of Spain. The Spaniards being much distressed, offered to quit Sicily; but the admiral declared, that the troops should never be suffered to quit the island till the king of Spain had acceded to the quadruple alliance. And to his conduct it was entirely owing that Sicily was subdued, and his Catholic majesty forced to accept the terms prescribed him by the quadruple alliance. After performing so many signal services, the king received him with the most gracious expressions of favour and satisfaction; made him rear-admiral of England and treasurer of the navy, one of his most honourable privy-council, baron Byng of Southill in the county of Bedford, viscount Torrington in Devonshire, and one of the knights companions of the Bath upon the revival of that order. In 1727, George II. on his accession to the crown, placed him at the head of his naval affairs, as first lord commissioner of the admiralty; in which high station he died January 15th 1733, in the 70th year of his age, and was buried at Southill in Bedfordshire.

BYNG (the honourable George), esq. the unhappy son of the former, was bred to sea, and rose to the rank of admiral of the blue. He gave many proofs of courage; but was at last shot, upon a dubious sentence for neglect of duty, in 1757. See **BRITAIN**, n^o 428.

BYRLAW or **BURLAW**-Laws in Scotland. See **BY-LAWS**.

BYROM (John), an ingenious poet of Manchester, born in 1691. His first poetical essay appeared in the *Spectator*, n^o 603, beginning, "My time, O ye muses, was happily spent," which, with two humorous letters on dreams, are to be found in the eighth volume. He was

Byng
Byrom.

Byrrhus
Byzantium.

was admitted a member of the royal society in 1724; and having originally entertained thoughts of practising physic, to which the title of *doctor* is incident, that was the appellation by which he was always known: but reducing himself to narrow circumstances by a precipitate marriage, he supported himself by teaching a new method of writing short-hand, of his own invention; until an estate devolved to him by the death of an elder brother. He was a man of lively wit; of which, whenever a favourable opportunity tempted him to indulge it, he gave many humorous specimens. He died in 1763; and a collection of his Miscellaneous poems was printed at Manchester, in 2 vols 8^{vo}. 1773.

BYRRHUS, in zoology, a genus of insects belonging to the order of coleoptera. The feelers are clavated, pretty solid, and a little compressed. There are five species, all of which are to be found on particular plants; and principally distinguished from one another by the colour and figure of the elytra, or crustaceous wing-cases.

BYSSUS, in botany, a genus of mosses belonging to the cryptogamia algae. The character is taken from this circumstance, that they are covered with a simple capillary filament or down, resembling soft dust. There are 15 species, all natives of Britain, growing upon rotten wood, old walls, &c.

Byssus, or *Byssum*, a fine thready matter produced in India, Egypt, and about Elis in Achaia, of which the richest apparel was anciently made, especially that wore by the priests both Jewish and Egyptian. Some interpreters render the Greek *βυσσος*, which occurs both in the Old and New Testament, by *fine linen*. But other versions, as Calvin's, and the Spanish printed at Venice in 1556, explain the word by *silk*; and yet byssus must have been different from our silk, as appears from a multitude of ancient writers, and particularly from Jul. Pollux. M. Simon, who renders the word by *fine linen*, adds a note to explain it; viz. "that there was a fine kind of linen very dear, which the great lords alone wore in this country as well as in Egypt." This account agrees perfectly well with that given by Hesychius, as well as what is observed by Dochart, that the byssus was a finer kind of linen, which was frequently dyed of a purple colour. Some authors will have the byssus to be the same with our cotton; others take it for the *linum aspestivum*; and others for the lock or bunch of silky hair found adhering to the pinna marina, by which it fastens itself to the neighbouring bodies. Authors usually distinguish two sorts of byssus; that of Elis; and that of Judaea, which was the finest. Of this latter were the priestly ornaments made. Bonfrerius notes, that there must have been two sorts of byssus, one finer than ordinary, by reason there are two Hebrew words used in Scripture to denote byssus, one of which is always used in speaking of the habit of the priests, and the other of that of the Levites.

BYZANTIUM, an ancient city of Thrace, situated on the Bosphorus. It was founded, according to Eusebius, about the 30th Olympiad, while Tullus Hostilius reigned in Rome. But, according to Diodorus Siculus, the foundations of this metropolis were laid in the time of the Argonauts, by one Byzas, who then reigned in the neighbouring country, and from whom the city was called *Byzantium*. This Byzas, according to Eustathius, arrived in Thrace a little

Byzantium.

before the Argonauts came into those seas, and settled there with a colony of Megarenes. Velleius Paterculus ascribes the founding of Byzantium to the Milesians, and Ammianus Marcellinus to the inhabitants of Attica. Some ancient medals of Byzantium which have reached our times, bear the name and head of Byzas, with the prow of a ship on the reverse. The year after the destruction of Jerusalem by Titus, Byzantium was reduced to the form of a Roman province. In the year 193 this city took part with Niger against Severus. It was strongly garrisoned by Niger, as being a place of the utmost importance. It was soon after invested by Severus; and as he was universally hated on account of his cruelty, the inhabitants defended themselves with the greatest resolution. They had been supplied with a great number of warlike machines, most of them invented and built by Perifus a native of Nicæa, and the greatest engineer of his age. For a long time they baffled all the attempts of the assailants, killed great numbers of them, crushed such as approached the walls with large stones; and when stones began to fail, they used the statues of their gods and heroes. At last they were obliged to submit, through famine, after having been reduced to the necessity of devouring one another. The conqueror put all the magistrates and soldiers to the sword; but spared the engineer Perifus. Before this siege, Byzantium was the greatest, most populous, and wealthiest city of Thrace. It was surrounded by walls of an extraordinary height and breadth; and defended by a great number of towers, seven of which were built with such art, that the least noise heard in one of them was immediately conveyed to all the rest. Severus, however, no sooner became master of it, than he commanded it to be laid in ashes. The inhabitants were stripped of all their effects, publicly sold for slaves, and the walls levelled with the ground. But by the chronicle of Alexandria we are informed, that soon after this terrible catastrophe, Severus himself caused a great part of the city to be rebuilt, calling it *Antonina*, from his son Caracalla, who assumed the surname of *Antoninus*. In 262, the tyrant Gallienus wreaked his fury on the inhabitants of Byzantium. He intended to besiege it; but on his arrival, despaired of being able to make himself master of such a strong place. He was admitted the next day, however, into the city; and without any regard to the terms he had agreed to, caused the soldiers and all the inhabitants to be put to the sword. Trebellius Pollio says, that not a single person was left alive. What the reason was for such an extraordinary massacre, we are no where informed. In the wars between the emperors Licinius and Maximin, the city of Byzantium was obliged to submit to the latter, but was soon after recovered by Licinius. In the year 323, it was taken from Licinius by Constantine the Great, who, in 330, enlarged and beautified it, with a design to make it the second, if not the first city in the Roman empire. He began with extending the walls of the ancient city from sea to sea; and while some of the workmen were busied in rearing them, others were employed in raising within them a great number of stately buildings, and among others a palace no way inferior in magnificence and extent to that of Rome. He built a capitol and amphitheatre, made a circus maximus, several forums, porticoes, and public baths. He divided the whole city into 14 regions, and granted

Byzantium. granted the inhabitants many privileges and immunities. By this means Byzantium became one of the most flourishing and populous cities of the empire. Vast numbers of people flocked thither from Pontus, Thrace, and Asia, Constantine having by a law, enacted this year (330), decreed, that such as had lands in those countries should not be at liberty to dispose of them, nor even leave them to their proper heirs at their death, unless they had an house in his new city. But however desirous the emperor was that his city should be filled with people, he did not care that it should be inhabited by any but Christians. He therefore caused all the idols to be pulled down, and all their churches consecrated to the true God. He built besides an incredible number of churches, and caused crosses to be erected in all the squares and public places. Most of the buildings being finished, it was solemnly dedicated to the Virgin Mary, according to Cedrenus, but, according to Eusebius, to the God of martyrs. At the same time Byzantium was equalled to Rome. The same rights, immunities, and privileges, were granted to its inhabitants as to those of the metropolis. He established a senate and other magistrates, with a power and authority equal to those of Old Rome. He took up his residence in the new city; and changed its name to CONSTANTINOPLE, which it has ever since retained.

BZOVIVS (Abraham), one of the most celebrated writers in the 17th century, with respect to the astonishing number of pieces composed by him. His chief work is the continuation of Baronius's annals. He was a native of Poland, and a Dominican friar. Upon his coming to Rome, he was received with open arms by the Pope, and had an apartment assigned him in the Vatican. He merited that reception, for he has imitated Baronius to admiration in his design of making all things conspire to the despotic power and glory of the papal see. He died in 1637, aged 70.

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62	XLIX.			77	LXIII.		
63	L.			78	LXIV.		
64	2 ^d L.			79	LXV.		
65	LL.			80	LXVI.		1392
							1532

N. B. ERRATA, OMISSIONS, &c. noticed and supplied in the APPENDIX.



